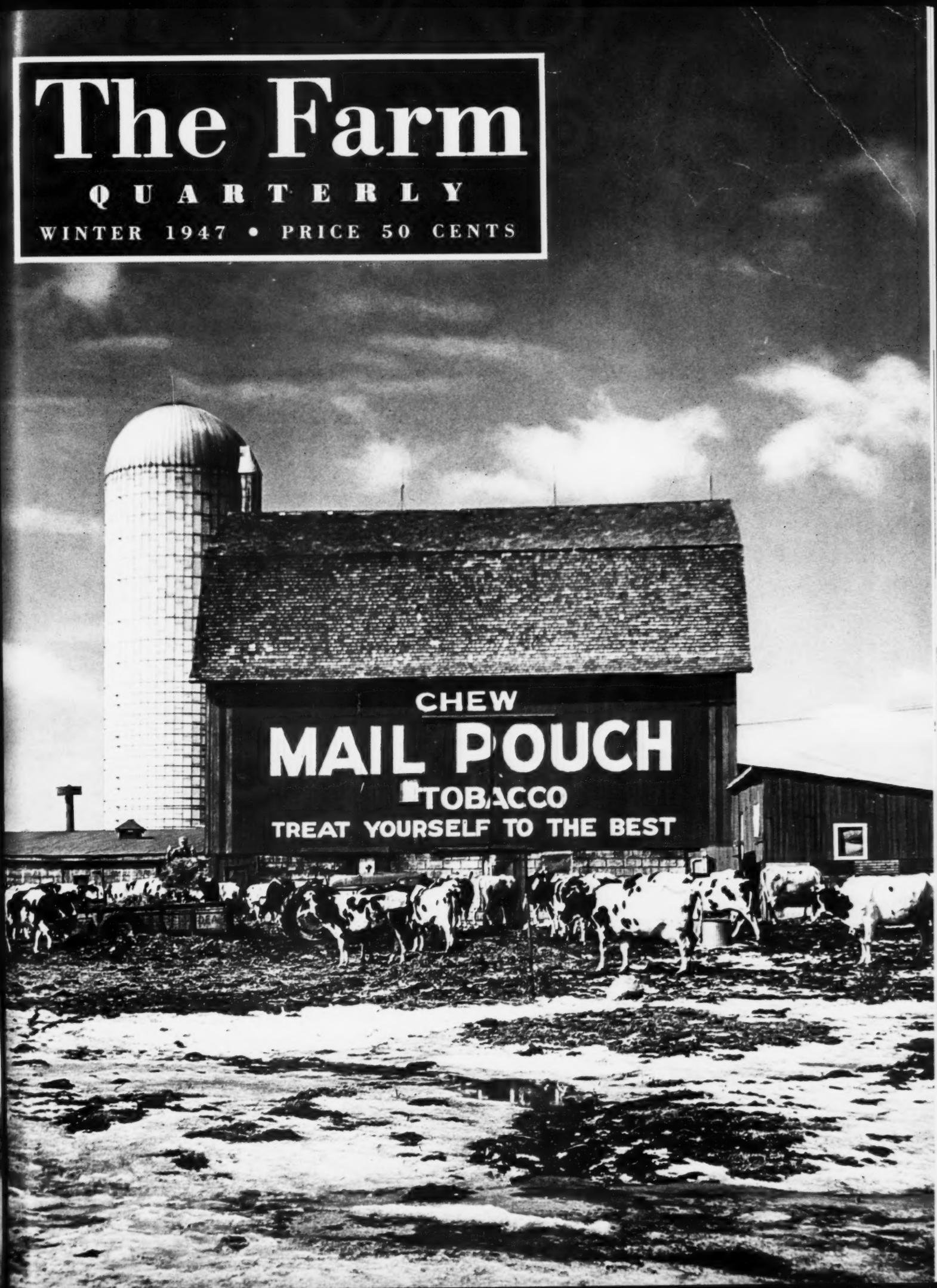
The Farm

QUARTERLY

WINTER 1947 • PRICE 50 CENTS



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VIGOR · · ·
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YOURS THE YEAR AROUND
WITH WILSON "ZEROSAFE" FREEZERS

Wilson "ZEROSAFE" Farm Freezer
Sectional Model FF-30 . . . Capacity 30 cu. ft.
OTHER MODELS FROM 15 TO 120 CU. FT.

A RICH DAILY EXPERIENCE

The great new Wilson time-tested "ZEROSAFE" Farm Freezers make farm and ranch cuisine a rich daily experience in excellence, variety, and abundance, just as Wilson freezers have increasingly revolutionized rural living every year since 1939.

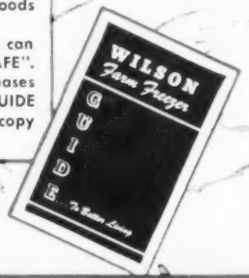
Seasonal surpluses formerly not utilized to best advantage are now packaged and frozen at the peak of their flavorful goodness and are stored within easy reach, ready for instant use at any time during the year.

These home-frozen, top-quality fresh fruits, vegetables, meats, poultry, seafood, game, dairy products, baked goods and cooked foods provide better, more healthful, zestful living with less labor and with a large saving in money.

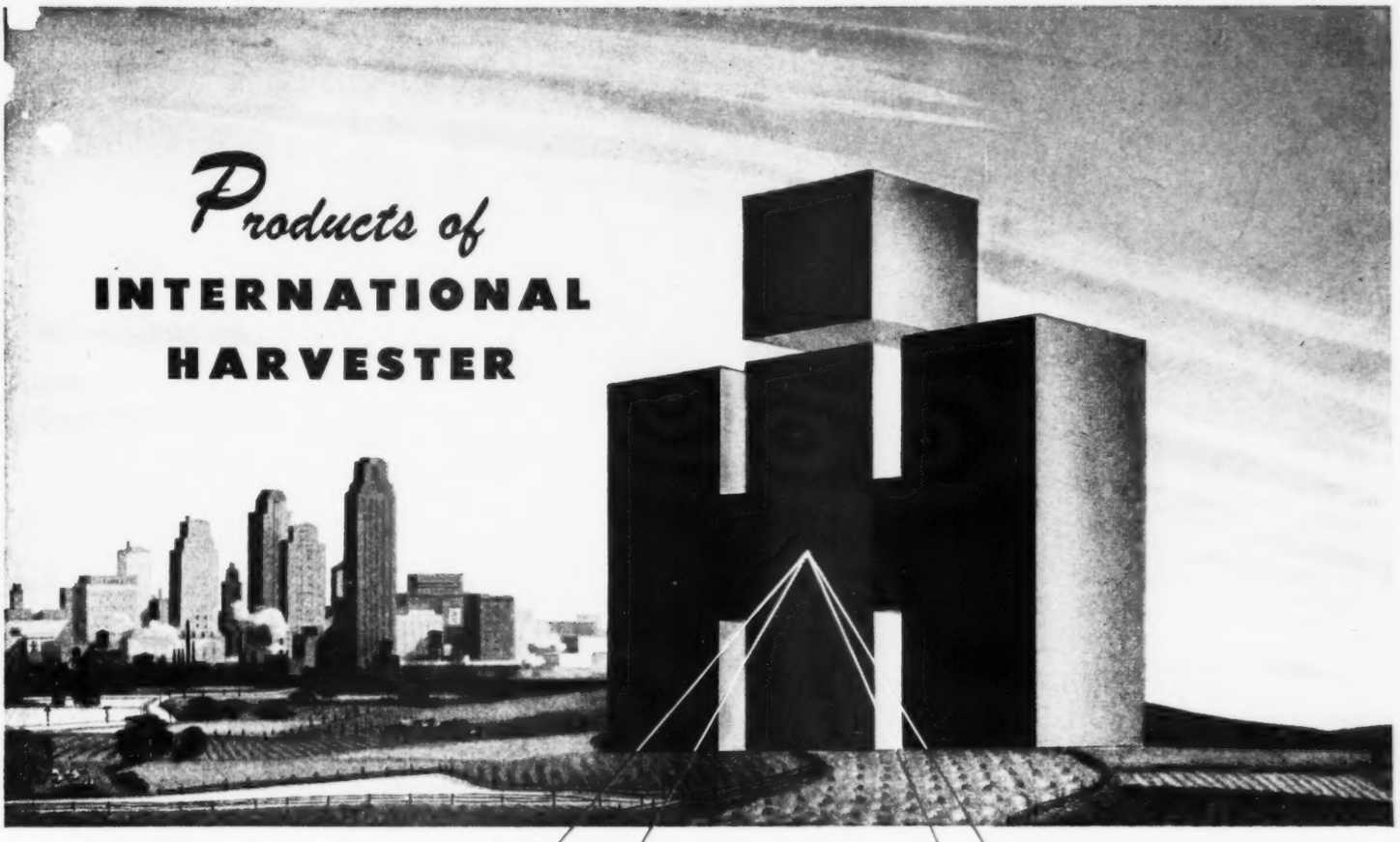
Because of their goodness and vitamin-richness, Wilson "ZEROSAFE" foods promote health and vigor and joy of living.

And the best part of the whole procedure is that even an intelligent child can follow Wilson instructions and get invariably good results with "ZEROSAFE".

AT NO COST TO YOU let us send you our invaluable booklet on all phases of the home-freezing of foods, the authoritative "Wilson Farm Freezer GUIDE to Better Living." Send your name and address now to Dept. 51 for your copy of the "GUIDE".



WILSON REFRIGERATION, INC.
DIVISION OF WILSON CABINET CO., INC. SMYRNA, DELAWARE



What the International Harvester symbol means:

TRUCKS—The complete line of International Trucks offers the farm operator a wide choice of models and sizes to fit his exact needs. For more than 40 years farmers have relied on Internationals.

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Products to save labor, increase production and provide better living.

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A company dedicated, since its beginning, to the progress of agriculture, to a better way of life for the men, women and children who live and work on the six million farms of this nation.

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Two hundred and twelve branches and company-owned outlets, and more than 9,000 dealers, to distribute International Harvester products and to supply after-sale service.

Excellence of product now, with *greater* excellence always in preparation for the future.

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Tune in James Melton on "Harvest of Stars" every Sunday! NBC Network.

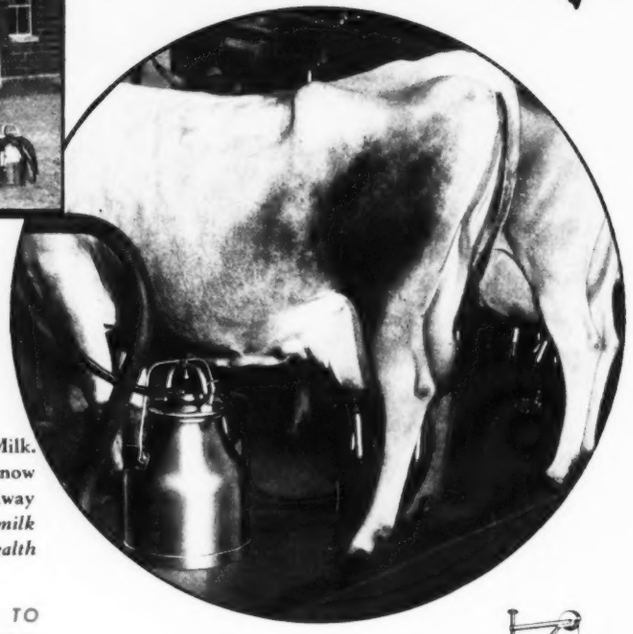
CRAWLER TRACTORS—Many large-scale farm operators prefer International Crawler Tractors for specialized farming. They know they can depend on them for reliable low-cost power.

REFRIGERATION—Beautifully designed, efficient . . . new International Harvester Refrigeration brings new leisure and convenience particularly to the rural homemakers of America.

"Why I Changed to De Laval Magnetic Speedway Milking..."

"WE WANTED TO ESTABLISH AN ABSOLUTELY UNIFORM PULSATION RATE WHICH CANNOT BE CHANGED BY THE INDIVIDUAL OPERATORS • THIS CANNOT BE ACCOMPLISHED WITH NON-MAGNETIC TYPE MILKERS." **Indian Spring Farm, Darlington, Maryland**

Charles W. Collier, Owner



Right, Mr. Collier! UNIFORM PULSATIONS MEAN MORE PRODUCTION, MORE PROFITS

And that is why Indian Spring Farm, owned by Mr. and Mrs. Charles W. Collier, at Darlington, Maryland, discarded their previous make of milker and installed a new 16-unit De Laval Magnetic Speedway.

The Indian Spring Jersey herd is one of the oldest in the country . . . is the largest Jersey herd in the world on complete HIR test . . . and the largest producer of trademarked Jersey Creamline Milk.

No matter what make of milker you now use . . . a new De Laval Magnetic Speedway Milker will produce *more and cleaner milk . . . larger profits . . . better herd health . . . greater time and labor savings.*

NOW'S THE TIME TO CHANGE TO

THE NEW DE LAVAL

New De Laval Magnetic Speedway Milker

De Laval engineered for still better, faster, cleaner milking. New stainless steel unit and new Pulso-Pump.

New De Laval Sterling Milker

Another great new De Laval Milker for still better milking. Stainless steel units.

New De Laval World's Standard Series Separators

The cleanest skimming, easiest-to-clean separators ever built. Every part milk touches is stainless steel. Hand or motor drive.

New De Laval Speedway Food Freezers

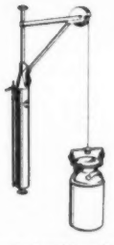
For better food preservation and better farm living. Improved table fare at lower cost. Beautiful in appearance—dependable and economical in operation. Two popular sizes.

New De Laval Speedway Water Heater

De Laval engineered for the dairyman. Supplies 12 full gallons of 185° water. "Lifetime" copper tank.

New De Laval Speedway Milking Truck

Complete with strip cup and four pails for hot water, clean udder towels, chlorine solution and used towels.



New De Laval Speedway Vacuum Can Hoist

Takes the work out of loading and unloading the milk cooler. Operates on vacuum supplied by milker pump.

De Laval

DE LAVAL SPEEDWAY

THE DE LAVAL SEPARATOR COMPANY

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- ☐ De Laval Separators
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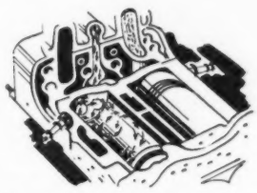
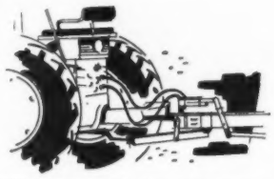


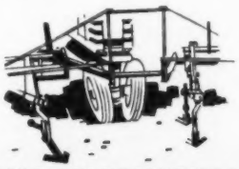
"..there's *EVERY REASON* why your next tractor should be a JOHN DEERE"

NEW POWER. *Cyclonic* fuel intake engines improve combustion, increase efficiency. Available in either all-fuel or gasoline types.



NEW POWR-TROL. You raise, lower, and adjust integral *and* drawn equipment at a touch of your hand . . . by smooth, positive *hydraulic* power.

NEW ROLL-O-MATIC FRONT WHEELS. Weight is automatically equalized on both front wheels to give you "knee action" comfort and easier steering than ever before.



NEW QUIK-TATCH CULTIVATORS. Just drive in and hook up in a matter of minutes. Here's top efficiency combined with real savings in change-over time.

HERE ARE just a few of them—and they're upsetting all previous standards of tractor performance, comfort, and ease of handling! They're features you get in addition to the time-proved advantages of owning a John Deere *Two-Cylinder* Tractor with its unequalled simplicity and strength of parts —advantages that offer you *lower* upkeep costs . . . *more* years of service . . . and *greater* freedom from costly field delays.

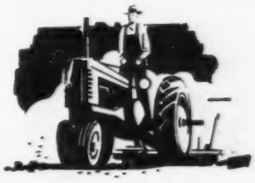
. . . GET THE FACTS NOW!

This new folder tells all about the great new John Deere "A" and "B" Tractors and why they are today's outstanding values. Write to John Deere, Moline, Illinois, Dept. **TR-54**, for your *free* copy. Do it today.

JOHN DEERE
two-cylinder tractors
First IN MODERN DESIGN AND PROVED PERFORMANCE

NEW DEEP-CUSHION SEAT. Here's a feature that greatly increases your comfort. Seat is roomy and fully adjustable. Arm and back rests safeguard operator.

UNEXCELLED VIEW. You're up high, out of the dust, where you have a perfect view of the work on *either* side from a natural, relaxed position.



SIT-OR-STAND PLATFORM. There's plenty of leg room. You stand up as easily as rising from a chair, *without* changing the seat position.

HARRY SCHOGER, Plainfield, Illinois
Men's Class Winner in National plowing matches at Big Rock, Illinois, and Wheatland, Illinois

ROBERT ERICKSON
Championship Class Winner in National plowing matches, Big Rock, Illinois, and Wheatland, Illinois

GENE FERGUSON, Oskaloosa, Iowa
Open Class Contour Winner, Webster City, Iowa

Firestone

CHAMPION GROUND GRIPS

CHOICE of CHAMPIONS

IN ALL THREE 1947 NATIONAL PLOWING MATCHES

CHAMPION Plowmen know that the performance of their tractor tires can "make" or "break" them in a plowing match. They must have tires that take hold and pull — on soft ground — on hard ground — on sod — on stubble. They must have tires that take a full, clean bite, a center bite — tires that plow right through under all conditions.

That's why winners in the three big national matches this fall (Big Rock, Wheatland, Illinois and Webster City, Iowa), plowed on Firestone Tires. They, like most other contestants in these big events, could not afford to gamble with a "broken center" tire that might let them down by clogging up with trash, slipping and spinning.

Firestone Champion Ground Grips will perform for you on every job just like they perform for champion plowmen. They will always take you through. And they will take you through faster, without slipping. That means time and money saved.

Specify Firestone Champions when you order a new tractor or when you buy replacements for your present tractor. See your nearest Firestone Store or Dealer Store today.

Listen to the Voice of Firestone every Monday evening over NBC

Copyright, 1947, The Firestone Tire & Rubber Co.

Only FIRESTONE CHAMPION GROUND GRIPS TAKE a "CENTER BITE"

Farm's Pictures

The following list, page by page, shows the source of each picture in this issue. When more than one source is represented on a single page, credit starts at upper left to right, top to bottom.

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THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

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New all through!

NEW ENGINES! Brand new Six, two power-packed new V-8's. Up to 145 horsepower! Dozens of new advancements!

NEW CABS! Million Dollar Cab with living room comfort! New, exclusive Level Action cab suspension that insulates cab from vibration and frame weave!

NEW FRAMES! Tougher, more rugged than ever! New axles, new steering, new brakes. They're new all through!

NEW BIG JOBS! Two of 'em . . . biggest Ford Trucks ever built! Gross vehicle weights up to 21,500 pounds. Tires up to 10.00-20. Brakes up to 16" x 5". 145 H.P. V-8 engine.

NEW MODELS! Five new series . . . more than 115 Ford models! There's a Ford Truck for your hauling needs!

Listen to the Ford Theater over NBC stations Sunday afternoons 5:00 to 6:00 p. m., Eastern Standard Time.

Bonus* Built—AMAZING RESULT OF AN ENGINEERING PRINCIPLE

The great new Ford Trucks for '48 are revolutionary not only because they are *new all through*, but because they are the amazing result of a time-proved truck engineering principle. This principle is Ford Bonus Built construction!

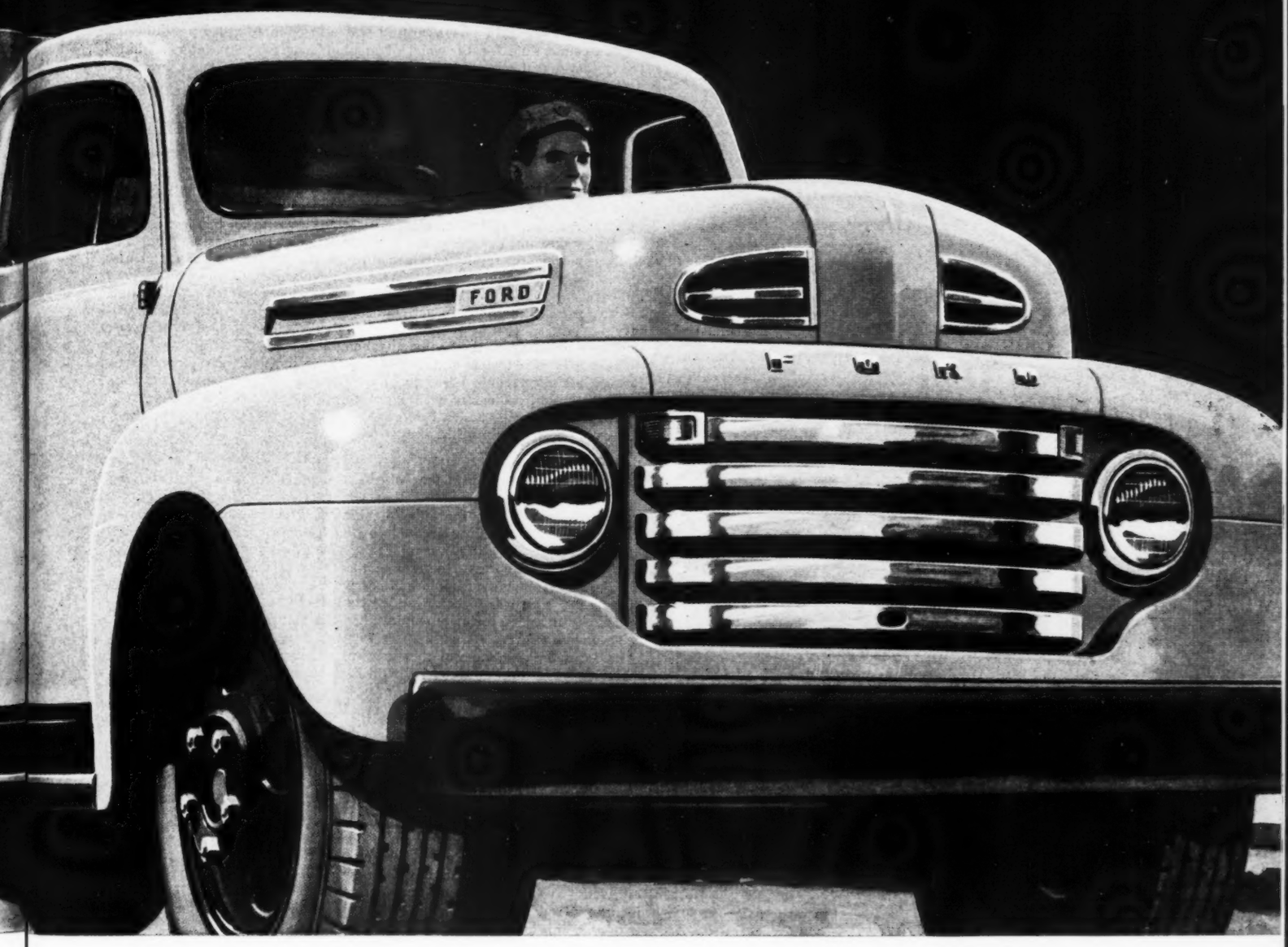
Bonus Built = Extra Strength! Every single one of the great new Ford Trucks for '48 is designed and built with *extra strength* in every vital part—that's Bonus Built! But that is only *part* of this vital truck building principle . . .

Bonus Built = Work Reserves! This *extra strength* provides WORK RESERVES that pay off for truck operators in two important, money-saving ways . . .

Bonus Built = Greater Range of Use! These Bonus Built *work reserves* give Ford Trucks a *greater range of use* by permitting

FORD Bonus* Built TRUCKS

BUILT STRONGER TO LAST LONGER



THAT ASSURES LONGER TRUCK LIFE . . . and ONLY Ford Trucks Have It!

them to handle loads beyond the normal call of duty! Ford Trucks are *not* limited to doing one single, specific job!

Bonus Built = Longer Life! What's more, these same *work reserves* allow Ford Trucks to relax on the job . . . to do their jobs easier, with less strain and less wear. Thus, Ford Bonus Built Trucks last *longer* because they work *easier!*

Here's the top truck value of the year! See the great new line of Ford Bonus Built Trucks for '48 now! Don't settle for less—get the only truck that's Bonus Built! It's Ford!

***BONUS:** "Something given in addition to what is usual or strictly due."
—Webster's Dictionary*

LIFE INSURANCE EXPERTS PROVE . . . FORD TRUCKS LAST UP TO 19.6% LONGER!

RIDE

Get a Comfortable Riding Sulky

DON'T WALK when you can ride! This new Dandy Boy Riding Sulky takes you off your feet — puts you in a comfortable seat over two cushiony rubber-tired wheels. Wherever your tractor goes, you ride in comfort . . . in style. Controls within easy reach. Friction brakes. Be one of the first to enjoy this new Dandy Boy Riding Sulky!

Get one of the New Dandy Boy Dump Carts, too. Users say "it's the handiest thing on the place." Haul wood, shrubs, sod, garden tools, transplants, crates or baskets. All steel. Removable gates. Convenient seat and foot rests. See your dealer NOW!

Enjoy This Convenient Dump Cart

A tubular steel handle is furnished with each unit so it can also be used as a push cart.

SPECIAL COMBINATION OFFER!

So many people want *both* the Dandy Boy Riding Sulky and Dandy Boy Dump Cart that a special combination deal is now available. You can save 30% by ordering Deal No. 125, because you need only *one* set of wheels for both outfits. It takes only a few minutes to switch from the sulky seat to the dump cart and back again. Whether you want the riding sulky, the dump cart, or both — see your garden tractor dealer NOW. He can give you immediate delivery. Put these easy-riding attachments to use in your yard and garden. Save time. Save work. Get extra pleasure—and extra use out of your garden tractor! Complete literature on request.

See your Garden Tractor Dealer or Write Direct to Dept. FQ-4-48

THE MIDLAND CO.
SOUTH MILWAUKEE, WISCONSIN

LETTERS

A RADIO-ACTIVE FERTILIZER

Sir:

I have a progress report to make to the readers of FARM QUARTERLY concerning our experiments with minute quantities of radio-activated material applied to soil. To scientists, the subject is not a new one.

Experiments Underway for 25 Years

It was this writer's privilege to become deeply interested in radioactivity more than a quarter of a century ago. My primary interest was concentrated on the medical uses of radioactivity, yet soon enough I realized that the field of agriculture was also open to great possibilities in this connection, for the good of mankind. A few years later, within the framework of a corporation which I had established in Paris, France, a special department was set up, with a threefold aim: first, to undertake and to encourage theoretical studies in the field of radioactivity in its relation to agriculture; second, to produce a special radioactivated fertilizer; and third, to sponsor large-scale and systematic experimentation in the use of this fertilizer.

My experiments in France, in 1933 established a definite fact, namely, that a radioactive fertilizer, under certain conditions, was bound—in at least fifty per cent of those early experimental cases—to lead to a betterment of the plant and, if used over a certain area, to an increase in the yield of crops and especially to an acceleration of the ripening time. By 1935, experimental results obtained through the cooperation of scores of individual French agriculturists, were to be classified approximately as follows: out of about one thousand cases, 25 per cent showed highly favorable results, another 25 per cent showed favorable results, and about fifty per cent showed no practical results, due to either lack of interest or improper handling of the radioactive compound.

Having been active in the United States, in the field of radioactivity, for the last seven years, I was again attracted by the vast possibilities for further study of radioactivity in agriculture, in a country where improvements, new methods, and a constant search for progress are the guiding factors in every field of initiative.

USA Experiment Begun 1943

In my capacity as president of the *Canadian Radium & Uranium Corporation* of New York, together with Mr. Alexander Pregel, vice-president of the same corporation, I initiated, a few years ago, an experimental project on a farm located in one of the lower counties of the State of New York, within a comparatively short distance from New York City. Our purpose was to determine the effect of the administration of certain fixed dosages of alpha-radioactive compounds on certain vegetable crops. This was to be an added component to the fertilizing agent, organic or inorganic, usually employed in the planting of selected species of vegetables.

Before describing some of the practical results obtained in our experimental work in this country, I should like, however, to go back to a few preliminary considerations.

Radiation Can Be Beneficial

It is a well-known fact in medicine that, when feeble doses have been administered, radiations and emanations emited by Radium and other radioactive substances have had a stimulating effect on cells and tissues and that, on the contrary, high or massive doses of these radiations and emanations have been harmful to or destructive of cells and tissues. This same principle applies to plants as well, and it should be noted that agricultural experiments in which weak doses of either Radium or alpha-ray material were used, showed undeniably favorable results. It is a fact that a great similarity exists between vegetable and animal organisms, especially as to the physiological action caused by nutritive elements, including radioactive elements. The chief difference between plants and animals lies only in the fact that plants manufacture their own organic matter from mineral combinations which they find in the soil and air around them, while animals obtain their nutritive matter mainly at the plant's expense, by consuming such plants as food.

According to the quantity of radioactive elements in living organisms, these elements belong to either the group of macro-elements like potassium, or to the group of micro- and ultra-micro-elements, so called because of the extremely minute quantities in which they are to be found in living matter. Their difference from the other chemical elements is due to the fact that these radioactive elements produce not only chemical energy or heat, but also continuously emanate intra-atomic energy, or kinetic energy as a result of the disintegration of atoms within these radioactive elements.

Whenever, in the past, harmful or destructive effects have been observed in the field of radioactivation of plants, these negative results, in the light of recent studies, were due to a high dosage of radioactivity employed. Quite a number of such cases can be traced to the fact that experimenters committed the error of considering Radium or the radio-

(Continued to page 12)

THAT Winning WAY..

with CATTLE- *El-Jon Eric, Grand Champion Bull* at the 5th Annual National Angus Show in Chicago, shown by Elliot Brown (left) of the El-Jon Farms, Rose Hill, Iowa. Says Mr. Brown, "In fitting our herd for breeding and showing, we find Wayne Sweet Mix very satisfactory and economical to use. We've used a complete line of Wayne Feeds and find each is built to do a superior job."

with SWINE- *"Winner's Glory"* (below), *Champion Hampshire Boar* at the Ohio State Fair; Best Type Hampshire Boar shown at the National Type Conference held at Ohio State University. Raised the Wayne Way by Erwin and Walter Gebhart of the Diamond Acre Farm, Germantown, Ohio. He sold for $3,000.

.....PAYS OFF IN PRIZES and PROFITS!

With all classes of livestock and poultry, top breeders and feeders like those pictured here are finding that the Wayne Way is a *Winning* way. To get the "pay-off" in prizes and profits, take advantage of Wayne's special quality and the *Wayne Winning Way.* Wayne's full line of complete feeds and supplements are *tripled tested* for "Ingredient Quality" to help you get stepped-up production of meat, milk and eggs. See your friendly Wayne Feed Dealer today, or send the handy coupon below for full information about the Wayne Way of Feeding.

with DAIRY-

"Oastie Inkarnation Bussie," a Grand Champion at the National Dairy Show, is another Wayne Winner. She's one of 240 purebred Holsteins in the famous Hawthorn Farms herd at Libertyville, Ill . . . all fed the Wayne Way. Herd averages over 400 lbs. fat and consistently wins at leading shows.

with POULTRY-

Michigan's "Chicken of Tomorrow"—winner . . . 1st and 2nd in 1946 . . . 1st and 3rd in 1947. Lloyd Tice (above), of the Tice Hatchery and Poultry Farm, Barryton, Mich., has been a Wayne feeder for 8½ years. His 1947 Barred Rock winners averaged 5.2 lbs. at 14 weeks—av. dressed weight 4.3 lbs. Tice gets "That Winning Way" the Wayne Way.

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Hogs ☐ Dairy Cows ☐ Beef Cattle ☐

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Back of every successful livestock enterprise is a sound feeding program

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WAYNE POULTRY AND LIVESTOCK FEEDS

You can expand your facilities Now

new ALLOY STEEL BUILDINGS

"QUONSET" TRADE-MARK REG. U.S. PAT. OFF.

FRAMED WITH N-A-X HIGH-TENSILE LOW-ALLOY STEEL—**The Stran-Steel arch-rib framing members of the Quonset 36, Quonset 40 and Quonset Multiple are now fabricated of N-A-X HIGH-TENSILE. This great high-tensile steel increases structural strength and corrosion-resistance—makes the Quonsets still more durable and permanent.**

These great new Quonsets—framed with high-tensile low-alloy steel—are available now.

They are adaptable to dozens of farm building needs: main barn, fruit storage building, dairy barn, implement building, grain storage building, and many others.

The great structural strength of their high-tensile low-alloy steel framework assures lasting durability, low maintenance costs. Full freedom in the arrangement of interiors is provided by the patented nailing groove in Stran-Steel framing members.

Take advantage of this important building development to obtain the facilities you need—permanently, at low cost. Call or write today.

50% Greater Strength
Cost no more than ordinary steel buildings

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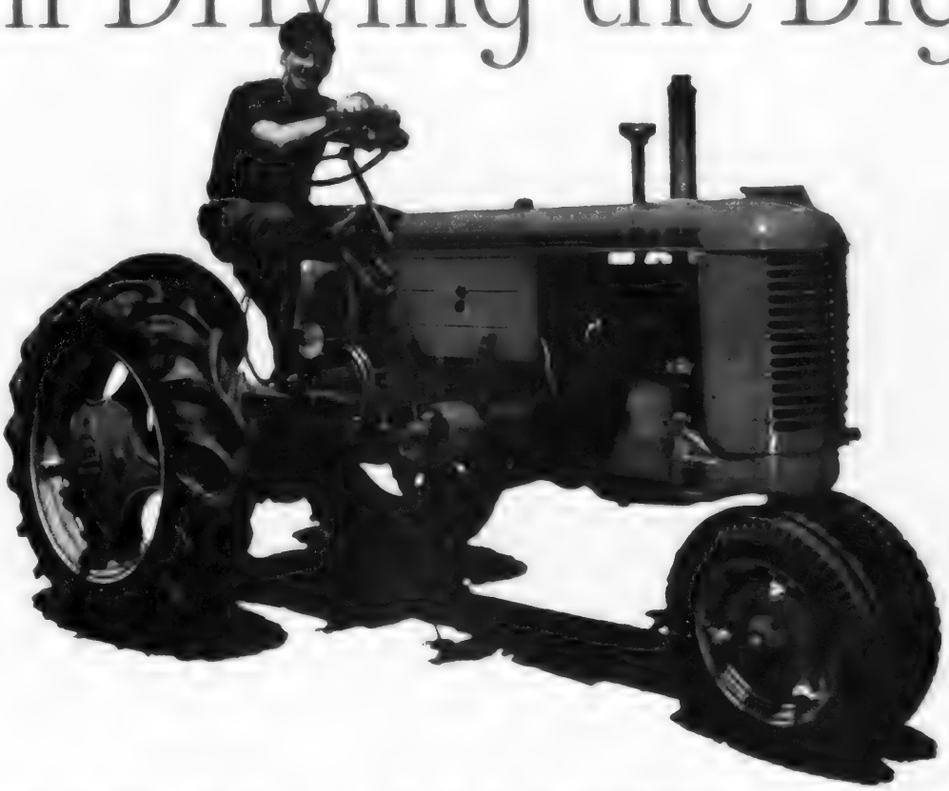

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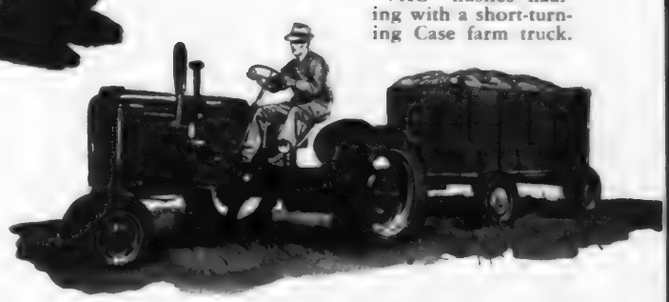

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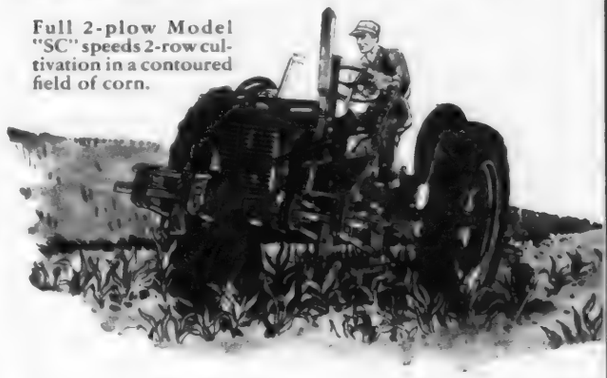

Full 2-plow Model "SC" speeds 2-row cultivation in a contoured field of corn.

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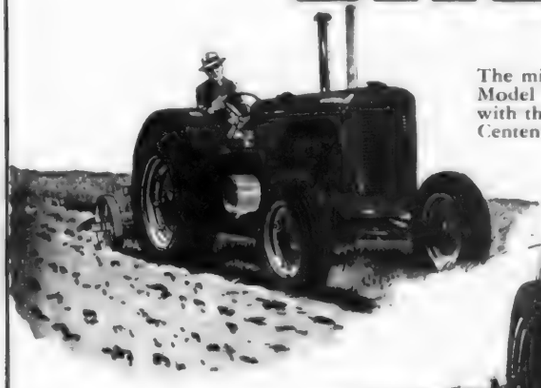

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A RADIO-ACTIVE FERTILIZER

(Continued from page 8)

active compound as a fertilizer in itself, which, of course, it is not. That is why the results were particularly good wherever radioactive materials were used in conjunction with an organic or inorganic fertilizing agent. To repeat, in order to be effective, the dosages must be feeble. In recent experiments conducted in the U.S.S.R., Radium was introduced in minute quantities going to one-billionth of one gram (10^{-9} gr.) and one ten-billionth of one gram (10^{-10} gr.) per kilogram of soil. The radium improved and quickened the growth and blooming of such varied plants as roses, sugar beets, peas, sunflower, cotton, and flax. And we should not forget the fact that the possibility of using such minute quantities of radioactive elements or their isotopes, presents a great advantage from the point of view of economy of expense when considered on the scale of region-wide or country-wide application.

There remains no doubt that radioactivity has, when used in minute quantities, a beneficial action upon the growth of plants and germination of grains, as well as upon acceleration of the nutritive process and, therefore, the possibility of multiplying seasonal crops within a given period of time.

It may be of interest to quote a very few extracts from published records of the last thirty or forty years.

In 1923, J. Stoklasa, in his paper on the *"Origin of the Chilean Nitrate Beds"* presented at the French Academy of Sciences, said:

> "The superior effectiveness of Chilean Nitrate as a fertilizer over synthetic and other nitrates is ascribed to its radioactivity."

Later, in 1934, L. L. Lagunov, of the Academy of Sciences of the U.S.S.R., had this to say:

> "Small doses of radioactive substances have a stimulating effect on plants."

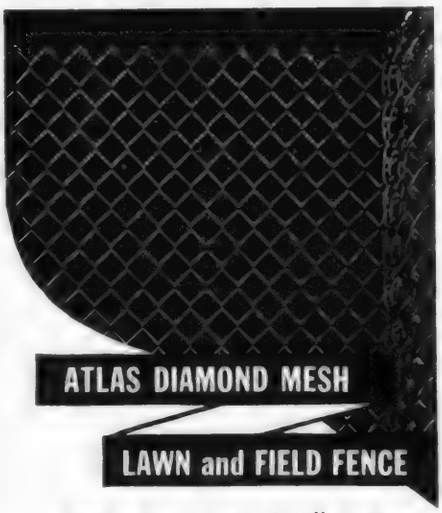
More recent experiments have shown that plants normally require a certain minute amount of radioactive elements for their natural growth, and that nature itself provides this amount through elements such as potassium, which is always radioactive. As attested, for instance, by published reports concerning experimental work conducted by the late Professor V. Vernadsky and his assistants of the Geo-Chemical Laboratory of the Academy of Sciences of the U.S.S.R., these recent experiments show that plants assimilate radioactive elements during all the vegetative periods; however, it has also been observed that plants need a greater amount of radioactive elements during their blooming and ripening periods, and that these elements are concentrated in the young organs of the plants. These same experiments have shown the content of Radium to be of the order of one-hundred-billionth per cent (10^{-11}) of the live weight.

Quantity Used Is Fantastically Minute

It has been shown that the best dosages for plants growing in water and in sand were found to be from one-billionth of one gram (10^{-9} gr.) to one ten-billionth of one gram (10^{-10} gr.) of Radium, and from one ten-thousandth of one gram (10^{-4} gr.) to one hundred-thousandth of one gram (10^{-5} gr.) of Uranium or Thorium per liter of the nutritive solution or per kilogram of sand. It has also been shown that Uranium, Radium and Thorium give a similar physiological action, and scientists are of the opinion that the optimum concentrations of separate radioactive elements for the plants are equi-radioactive. In other words, these concentrations answer to approximately the same amount of atoms disintegrating in a given unit of time.

Correct doses of radioactive elements have shown to have a beneficial effect on plants

(Continued to page 139)



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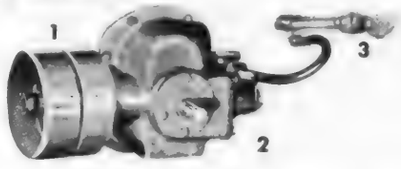

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WITH MORE FARM POWER PER DOLLAR

THERE ARE old washes in the Valley big enough to swallow a team, but new ones have been stopped by conservation practices.

Plum Valley

BY GEORGE LAYCOCK
and
DOROTHY DOUGLAS

Farmers in this Wisconsin community found that only by uniting could they effectively fight Erosion. At monthly meetings they help each other solve soil conservation problems.

WHEN the first settlers came to Plum Valley in 1850 there were forests of oak on the hillsides and along the creek that snaked through the Valley were thickets of wild plum trees. In autumn the children gathered the fallen plums from the banks of the creek and pulled them out of its pools with long sticks. They shared the wild fruit with the Winnebago Indians, but there was enough for all.

The red jam that the pioneer housewives made from the plums was often served with a dinner of wild duck or turkey. By the end of the first winter the creek and the fields above it were named for the fruit and called "Plum Valley."

The oaks of the Valley made the joists and framing timbers for the big barns, and the slopes they had covered were cleared for corn. By the turn of the century the creek had changed its course, for silt was washing down from the hillsides. The wild plum trees were gone and the fields stood bare at the mercy of drenching rains and winter thaws.

Ten years ago the farmers of the Valley began to worry.

The road across the bottom land on Bill Dreischmeier's farm had washed out in a flash flood. A section of the county

road had to be raised because the creek was silting up and overflowing. When workmen were changing a culvert near the foot of the Valley they dug into a section of rail fence that had been buried by silt carried from farms up the Valley. In 1945 Plum Creek flooded the Valley and Charles Schroeder said, "We lost four inches of top soil from a corn field that was just prepared, and brush washing down the creek ruined 60 rods of fencing."

When these farmers decided to take group action on their erosion troubles their first problem was to slow down the speed of the water that ran across their fields. They knew that the faster running water moves the more soil it can carry. By employing conservation practices throughout the Valley they could keep much of this water on their fields long enough for it to filter into the soil. The rest they could direct into grass drainage ditches where it could do little damage. The plan could succeed only when each of the farmers did his share in holding the water back, and providing safe grass protected waterways.

The change started one night in February of 1946 when 46 of the farmers from all over the Valley gathered at the Plum Valley schoolhouse to found an organization that is something new in soil conservation work. Here the farmers in one small watershed have grouped together in an effort to conserve the resources of the whole Valley.

They had seen how one farmer can have a complete conservation plan yet suffer from the effects of erosion when silt from farms up the Valley wash down and cover fields below. One farmer can employ contour farming, terracing, diversion ditches, renovate his pasture land, tile his wet land, and fence his woods, yet without the help of his neighbors do little toward making his community a better place in which to live. They felt that a conservation program to be effective must include more than one farm.

Plum Valley is in the northwest corner of Sauk County, Wisconsin, 75 miles north of Madison. It extends over into Juneau and Vernon counties. Most of the people in the Valley do their trading in Wonewoc, which is two miles from Plum Valley, and go there on Sundays to the German Lutheran Church.

From the headwaters of Plum Creek, where Joe Goodman has his farm, to the foot of the Valley where the creek joins the Baraboo River the Valley is about six miles long. The average width of the Valley is two and a quarter miles. It includes 9,660 acres of hilly land. There is some fairly level bottom land like that on the Otto Schmidt farm at the foot of the Valley, but his is the exception, for most of the land that drains its water into Plum Creek is steep and easily eroded. The top soil is shallow soil that the farmers had to do something about saving or eventually abandon.

This is a dairying community and most of the milk from its Holstein and Guernsey herds goes to the butter processing plant at Wonewoc. The owners know that they must keep these animals in feed but have begun to realize that they can substitute grass crops for corn. Everywhere in the Valley farmers are talking about grass silage and as time goes on more of them will store their grass crops this way. It fits into their new farm conservation plans that usually require five-year rotations.

The plan to organize the farmers was conceived in the mind of Perry Carroll, the local farm planner for the Soil Conservation Service. He had been visiting the Valley regularly since he took his job in Sauk County in 1942, and every time he traveled through those hills he could see more plainly the need for conservation action. He persuaded a few of the farmers to change over to contour farming; but most of them stuck to the old plan. One farmer said, "Perry had been coming out this way for years. He would leave some literature and in the evening when we got inside and took our shoes off we'd read it, but that was about as far as it would go. Then one time at a meeting he told us he thought it was about time to get started on a soil conservation organization."

The First Meeting

Forty-six farmers and their families attended the first meeting. Word had already reached farms throughout the Valley. News travels fast on a party line. The farmers knew why they were gathering and wasted little time in setting up a long range conservation program. They finished the meeting with enough ideas to keep them busy for several months. Their new by-laws stated that any farmer in the Valley could become a member of the association but that during his first year of membership he had to start using some conservation practices on his land.

POOR PASTURES fill few milk cans so most Plum Valley farmers have changed over to long rotations which provide better grazing and more hay for winter feeding.

FOR 30 YEARS Harve Schroeder farmed without regard for contours, and every year lost more soil. Now, with the help of Perry Carroll, he plants crops in contour strips, renovates pastures, and builds diversion ditches.

THE RAIN GAUGE, supplied by the Soil Conservation Service, is boarded out with a different family each year. After each rain this year John Dreischmeier and his wife carefully record the amount of rain and the period of time in which it fell.

The membership fee was set at one dollar a year and the fee included a whole farm. They appointed Emil Backeburg, who specializes in Guernseys and contours, temporary president and a couple of months later his neighbor Walter Larson was voted into the office for the first year.

Committees are appointed by the executive board rather than the president, to assure democratic representation to every part of the Valley. The board includes the president, vice-president, secretary, treasurer, and chairman of the Land Use Planning Committee.

The Land Use Planning Committee, which is the backbone of the whole plan, includes 35 farmers from all parts of the Valley. It is responsible for keeping the association on a straight path toward reaching its goals. The Committee inspects the work accomplished on Valley farms and compares the total accomplishments with what the group set out to do for the year. At meetings they render reports in progress, and outline goals for the future. The committee is divided into five sub-committees and each of these has five members. Each sub-committee is from a different section of the Valley.

There is a meeting the first Monday of every month. The meeting is held one month in the Plum Valley schoolhouse at the lower end of the Valley and the following month in the White Oak Grove school on the ridge at the head of the Valley. At the first meeting the farmers outlined their plans for the year. These included:

1. Set up a rain gauge and study the rainfall in the Valley.
2. Make soil profile of lower Plum Valley to learn facts about run-off and stream siltation.
3. Set up a community experimental farm.
4. Study differences in crop yields on eroded and non-eroded land.
5. Establish their goals for following years.
6. Erect signs which say, "Welcome to Plum Valley, sponsored by Plum Valley Conservation Association," along roads entering the Valley.

The Typical Meeting

The same enthusiasm has carried over from that meeting. For a typical winter meeting about sixty people have come to White Oak School. The men are standing around the back of the room telling each other about what's happening on the home place. A few of them are bringing in long benches and setting them across the middle of the room. The women and children are finding places for themselves in the row of double desks that extends down each side of the room.

The schoolhouse is already warm. The fire that has been burning in the large, square stove near the door was kept for the evening meeting. No one has put on Sunday clothes. The men are wear-

ing clean overalls and children's faces have been thoroughly scrubbed.

When it looks as though everyone has arrived, Walter Larson says, "Well, guess it's time to start, boys," and picks his way toward the front of the room. He raps on the teacher's desk with his pocket knife and calls the meeting to order. The men temporarily discontinue their discussions and find places on the benches. Those on committees begin to pull small notebooks from their pockets.

The secretary reads the minutes and the treasurer gives a report on the cash on hand. Dewey Peterson, Chairman of the Land Use Planning Committee points out, "It might be well to remind everyone again about the rules we made on the use of the doodlebug scraper. The rules were that it would cost a dollar a day whether the person who had it was using it or not. That was to keep one fellow from getting the doodlebug and keeping it several days after he was finished with it. I think we should let it go this time because the person who had it last week didn't know about the rule, but from now on we should stick to the regulation." As soon as the business is taken care of someone is on his feet making a motion for adjournment and he hardly gets into his seat before a motion picture screen is being set up in the front of the room. There is a short color movie that gives the main points for making a farm pond; then the children settle down for the second reel which shows how Clyde Beatty handles wild tigers.

When the movies are finished the men once more drift toward the rear of the room and give the women a chance to set out the lunch. The kids start to chase each other around the room and get in their mothers' way. Pie and cake are spread on benches in front of the blackboard. It isn't long until the aroma of hot coffee reaches the back of the room and the men begin to edge toward the food.

As soon as everyone has a plate and a cup of coffee and has found a place to sit, the conversation makes way for occasional bites of apple pie. The men haven't completely stopped talking even while they were filling their plates. While they finish their food they're talking about one of the farmers at the head of the Valley who has a serious erosion problem and isn't in the organization. Hilbert Griffa says, "John, he's your brother-in-law. You work on him." It's eleven-thirty by the time the farmers, thinking of the next morning's chores, start to round up their families.

Their Own Experiment Station

When the organization was formed the farmers decided that a demonstration was worth more than a lot of talk. To study first hand the results of different cropping practices on sloping land, the association decided to start its own experiment station. Frank Afton donated three and a half acres of his farm for the purpose and during slack days the farmers came in to get it started. Eight strips 30 feet wide and 300 feet long were laid out. At the bottom of each test strip is a siltation basin where the soil that washed from the strip can be measured. Each strip is under different farming practices and the measuring sticks set in the siltation basins reveal the amount of soil that washed away under different cultivations. Any time a Plum Valley farmer wants to know what a heavy rain did to similar fields of corn and hay, he can stop on his way to town and check

THIS 10-ACRE FIELD, now a good producer, was once abandoned by Joe Barbour because it was decorated with gullies. When conservation became popular in Plum Valley he changed the field to contours and gave it a new grip on life.

THE FARMERS BECOME SCIENTISTS when work is slack; they can gather on their own experimental plots on Frank Afton's farm at the foot of the Valley. On three and a half acres of sloping land there are eight test strips. Each is 300 feet long and 30 feet wide. There is a different rotation and plan of cultivation on every strip. Some are contoured while others run straight up the hill. At the foot of each strip is a siltation basin and a measuring stick that tells the story of what every rain does to the strip above it. The plots were one of the first cooperative projects.

the siltation basins. The experimental plots have become a gathering place when farm duties are slack. The Land Use Planning Committee is responsible for keeping the plots weeded and working.

Carroll knew that a wider interest would put more work in his hands than he would be able to finish alone. He knew, too, that the farmers would go farther if they understood how to lay contours and diversion ditches for themselves as well as the scientific principles behind conservation farming. To help get the job done faster he suggested a school in conservation principles for the farmers of the Valley. The course lasted for three nights and Carroll showed the farmers how to use a hand level and lay out contours on their own farms. "I had only two hands," he said, "and I knew that every one of the farmers who learned the methods we had to use would increase the amount of work we could accomplish." When the farmers had completed this short course they were able to talk with other farmers throughout the Valley and help them make plans for a change-over to contour farming.

A Plum Valley farmer can make up his own mind as to whether or not he will join the association. Naturally he cannot be forced into the plan against his will. The association does, however, have one important weapon at its disposal. This is public opinion. The more active members who are farming on the contour and carrying out complete soil conservation plans talk with the non-members every time they get a chance. Slowly the membership list is growing. There are now 60 farms in the association. Many of the farmers have joined because they can see the results of better land use on their neighbor's land across the fence; some have joined because they want to be part of a constructive conservation endeavor. In the beginning several of the Valley farmers said that they wanted nothing to do with the plan. It has been hard for these men to change their minds but as they see conservation methods increasing the crops on farms around them, they are gradually altering their own farm plans. Eventually almost every farmer in the Valley will belong.

Behind the success of the association is a program of education and information that has changed the thinking of the whole Valley. The plan has succeeded because the people no longer think of Plum Valley as a collection of school districts but think of it as a watershed drained by one stream. Three years ago most of these people had little idea of what watershed really means. Now they talk about conditions "over in our shed."

Conservation farming has changed the face of the Valley. The hills are beginning to take on a healthy appearance. Even before the association was formed, Plum Valley farms were productive. The men who farmed the hills knew what they were doing, and made the most of the natural resources with which they worked. Farmers here are hard working people whose ancestors immigrated from Germany and settled in southern Wisconsin sometime after 1850. They are conservative people who take slowly to new ideas but don't hesitate to follow them when the good of their farms depends upon it.

There is more than one reason why the Plum Valley Soil Conservation Association accomplishes more than the average county conservation district. The Plum Valley group has its greatest strength in the fact that the whole community agrees with the farmer who changes his century old plan and begins to farm around the curves. Every farm in the Valley has similar erosion problems and the farmers can see how soil conservation practices are solving these problems on neighbors' farms.

Harve Schroeder's Plan

Conservation farming has meant a change in the farmer's work. In some cases the whole farm system had to be reorganized and the land farmed in entirely different fashion. It happened this way on the Schroeder farm.

Harve Schroeder is no longer young. He has three children, one of them grown and living away. He has owned his farm for thirty years. A few years ago he began to realize that there had to be some changes made if he continued to farm his steep hillsides. With the help of Carroll he drew up a complete farm plan and in one year has changed his whole program to conform. Now that he has a good start Harve says, "The only thing that makes me want to kick myself is that I didn't start farming this way twenty-five years ago."

He bought his farm right after the first World War. There are 120 acres in one strip from the creek back across the hills. Most of the land is fit only for pasture, and the fields that can be cultivated should be in long rotations that include from two to four years of grass and hay crops. He wants to work into

WHEN HEAVY RAINS push Plum Creek out of its banks the bottom land is enriched with top soil from the slopes above. Because only a small part of the Valley is bottom land, the farmer's biggest concern is saving top soil on the hillsides.

WHEN THE Plum Valley Soil Conservation Association boys get together they exchange ideas and someone always comes up with a new one. To take some of the muscle work out of hay making Ray Reineke installed this mower which tips hay into any corner of the mow without tangling it. The pitchforks can be left in the field.

This is How Harve Schroeder Started

LAND USE MAP

Owner-Operator: Harve Schroeder
Acres in Farm: 120
Township: Woodland
Sections: 8, 17
Aerial Index: 7-A-79

Legend

Field Boundary--
Contour Strips--
Terraces--
Diversions--
Fence--
Field Number--
Water Outlet--

Field	Acres	Rotation	Practice
1	5	3 yr.COH	Contour
2	5	3 yr.COH	Contour
3	5	3 yr.COH	Contour
4	8	5 yr.COHHH	Terraces
5	14	5 yr.COHHH	Contour
6	14	5 yr.COHHH	Contour

Diversion terraces to be constructed as indicated on map.

six-year rotations as soon as he can. This will be a year of corn, a year of small grain, probably oats, and four years of hay.

All of his crop land except fifteen acres of bottom land along Plum Creek is steep enough that it must be either contour strip cropped or terraced. The contours and diversion ditches were laid out in the fall of 1946, and last spring Harve changed as much of his land over as he could find time for. The neighbors say that he tried to do three years' work in one but that he's getting along with it.

It was a January thaw in the winter of 1946 that made him fully conscious of the need for contours in his fields. "I had that piece behind the house all plowed up for spring planting," he said. "I'd put a lot of good lime and manure on it, too, then the thaw came. The water ran off that hillside and left a big gulley every rod clear across the field. All the water ran down between the barn and the house. During that thaw it was so deep that I couldn't get to the barn wearing four buckle overshoes without getting my feet wet. It just made me sick, and there I had to look at that field until seeding time. I told my wife, 'that's enough. I'm going to contour these fields.'"

He is no longer bothered with water running between the barn and house. The field is being farmed in strips that are on the contour. It is a long slope and two strips above the house is an 800-foot diversion ditch to carry run-off water from the field rather than let it chase on down the slope. On long slopes the Soil Conservation Service suggests a diversion ditch every fourth strip. When Schroeder has completed his readjustment from ordinary farming his farm will have five diversions.

Mrs. Schroeder helped plant 1500 pine seedlings on a gullied slope that is too steep to pasture. This will protect the land from future gulleying and eventually provide timber for farm use.

There are forty-one acres of pasture that will be permanent pasture as soon as Schroeder finishes working on it. He renovated fourteen acres last spring and this is now the best pasture on his farm. He worked it up with a "quack grass digger" which is a spring tooth harrow on wheels, and seeded it with a grass and legume mixture. After he had it dug up he seeded oats. In each bushel was mixed 8 to 9 pounds of brome grass. While the seedbed was still fresh he planted his pasture which included: 6-8 pounds of alfalfa, 4 pounds of red clover, and about one-half pound of ladino. Before he dug up the surface he gave the field between 200 and 400 pounds of a complete fertilizer per acre.

The middle of that same summer the field was ready to pasture. He divided it into three plots with single wire electric fences and rotated the cattle from one area to the other. Under this plan he has

(Continued on page 100)

FROM THE AIR Plum Valley is ribbons of crops wrapped around the slopes. Each farm is wedded to its neighbors by a cooperative plan of erosion control for the farmers consider the whole Valley as a unit. In these fields there is a diversion ditch every fourth strip to carry excess water around the curves and lighten the load on the strips below. Farmers are employing five and six year rotations to keep the fields in hay longer, and turning the extra grass crops into silage.

THE BIDDY on the right is a champion layer; she has a sharp eye, full red comb, clean cut beak, and she takes an interest in life. Her friend has forgotten when she laid her last egg; in her immediate future are a chopping block and a pot.

HOW TO CULL A HEN

SINCE nature failed to equip hens with egg numbering attachments, poultry men have to resort to their own poor inventions to identify the laying members of their flocks. Idle curiosity alone does not prompt the owner of a hen to delve into her personal production record; whether or not she is laying, how long she has been laying, and the number of breakfast eggs she has dropped into her nest since her last vacation are matters of extreme importance. If the answers to these questions are favorable, it means increased profits; if not, losses.

The answers, too, are important to the hen. If she doesn't get a passing grade she is forthwith chucked into a coop especially made to fit conveniently in a truck, and from there it isn't long until she finds herself surrounded by noodles and gravy.

The importance of culling is obvious. Loafing hens, hens with only short laying records, and spotty producers are expensive luxuries. A hen that is loafing eats as much as a laying hen. Since the temperamental egg market seems to operate on the very narrowest of margins between egg prices and the price of feed, a few loafers consume the profits from a large number of layers. The social value of a hen's company is nil. She is fed and sheltered for one purpose only—to lay an egg as often as possible. So when she stops laying, she is about as useful as a cold in the head. The specialist in egg production usually has a quick eye for the loafer, and periodic culling is part of his routine. The owner of small flocks, which include many farmers, often overlooks this important operation for two reasons. One, they have no way to check closely the performance of their hens and, two, they associate a drop-off in laying as being seasonal and inevitable. The farm wife rarely has a notion of how many hens she has in her flock and what percentage are laying. Many a farmer is carrying gnarled and aging pensioners which, at best, lay only a few eggs in the spring, and spend the rest of the year in a paradise of no work and all play with good food and pleasant companions.

Mrs. Luther McAllister, Quincy, Illinois, has a flock of about 200 "good"

White Leghorns. Her management is typical of the average farm. She keeps her flock in a house and enclosed poultry yard in the winter but allows it free range on the farm during the summer months. She hatches her own chicks, keeping a number of well-bred roosters with the flock at all times. During the summer, to supplement the range grass, she feeds some corn, which she gets from the crib and doesn't weigh or measure. During the winter she feeds corn and oats and some laying mash. Once in the spring and once in the fall she and her husband make a cursory examination of the flock and cull out what they believe to be the non-layers. She relies more on her memory of what the individual hen has done and on her general appearance rather than on scientific culling methods. Mrs. McAllister says many of her hens are four or five years old. She carries the flock records around in her head and thinks her hens might average about 80 eggs per year. She believes she makes money, but how much above feed costs she doesn't know. She expects a long lay-off during the moulting season and when this comes along she stops feeding grain.

In contrast with Mrs. McAllister's management is that of the commercial breeder and egg producer. The Gasson Poultry Farms of Versailles, Ohio, is typical of this group. John P. Gasson says:

"Our culling and selection goes on continuously. We operate an R. O. P. breeding farm and hatchery and we are always on the alert to improve our birds' production and health. Our foundation breeding stock is selected each year from 1800 trapnested candidates. Before going into our individual breeding pens they are carefully progeny tested on a family basis for egg production, egg size, egg quality, body weight, body type, vigor and health, livability, matchability, and other inherited factors. During the hatching season the eggs are carefully selected for size, shape, shell texture and interior quality. The chicks are healthy and plump; several times during the growing period they are sorted and culled on the basis of rate of growth, body type, vigor and health. At housing time the well-developed, vigorous, alert pullets are selected. Our pullets hold up very well under heavy egg production and only an occasional one need be removed before the following summer months. A bird is removed from our pens any time we believe she is unfit to remain any longer."

Harold Gray, manager of the Downs Poultry Farms, Romeo, Michigan, not only uses the most scientific culling methods, but throws in a dash of intuition. He says:

"Y'know there's really only one *sure* way to cull a hen. That's through trapnest records. Sounds like an obvious statement, but a lot of farmers don't realize it. I've handled hens for 25 years. Every time I handle 'em I cull 'em. Any poultryman does, down inside, whether he throws 'em out right then or not. We had 20,000 birds in '47 which was maybe a little bit above average. I'd say I've culled half a million birds.

"In culling, a man's got to look for more than one thing—and figure on the law of averages too. Now you take the 'Old Hogan System.' Remember when a hen used to be called a 'one, (two or three or four) finger hen.' With that system you used only the measurement between the pelvic bones—with maybe some slight consideration of the thickness of the bones themselves and their pliability.

"And that was a sight better than the way I hear the old German farm women used to cull 'em. They used to go out each morning before daylight, grab up each hen, and run their finger all the way up the vents to feel if there was an egg there. If there was no egg four mornings in a row, out she would go.

"These days we look for more than one thing. First there's the general health of the bird, how she looks, and how long she's been in production. Then a glance at the head and eye, color and shape—and don't forget the beak. Pigmentation changes as a bird's condition changes. Check the wing molt. Our feeling is that the condition of the wing molt is a check on past production—and we estimate our future production on the past production. Feeling of the pelvic bone is only an indication of present production—not necessarily a measure of past production or future possibilities, because pelvic bone structure can and does change with the physical condition of the bird. So when we cull 'em here we herd 'em all off to one side of the pen, go in, and start picking 'em up. While we're lifting 'em off the ground we check these points, toss in a little 'feel' and intuition, and decide which way to throw 'em, but fast."

In good commercial egg factories a hen is sent to the block when her egg produc-

ONLY BY TRAP NESTS can an accurate record of a hen's performance be kept. Detailed records, including weight of eggs, show which birds are the best breeders.

THE WIDTH between the pelvic and pin bones, and between the keel and pubic bones, is only one of the several ways to determine a hen's productiveness. This test alone may be misleading and such measurements should be weighed in with other tests for the laying hen. In general, the wider the space, the better layer is the hen.

tion falls below her feed and labor costs. As a rule of thumb this is somewhere in the neighborhood of 150 eggs a year at present prices. Many farm flocks, regarded as fair producers, will not average 100 eggs per hen per year. Many commercial plants report an average of 200 and over. A hen that lays 200 eggs per year is regarded as an excellent hen, and champions have been shooting at the 350 mark for several years, missing it by only a few eggs in 1947.

Two and three year old hens require more care and more frequent culling in order to secure profitable egg production. During recent years government extension poultry men have been advocating all-pullet flocks for greater profits. One of the best known commercial poultrymen in the Midwest, says: "Personally, I believe that during periods of low meat and egg prices it is desirable to keep 25 per cent or more of the better pullets during the second year of production. With low meat prices very little will be gained by selling them. However, they will lay larger eggs during their second year, and they bring higher prices."

The non-productive age of a hen is that age at which she stops laying. One might have profitable performance for two or three years if the hens are well-bred, well managed, and expertly culled. On some commercial breeding farms good hens are kept five or six years for breeding. A hen will live 13 to 15 years. It. is doubtful if such a bird is worth much except as a curiosity. She has long ago retired from the laying nest and no one but an extreme optimist would tackle her on the dinner table.

There is a second reason for culling the loafers; the best birds only are kept for breeders and the egg production of the flock over a period of years is increased. This, of course, does not apply where chicks are bought at a hatchery. In that case, the buyer must have faith in the quality of the chicks.

When To Cull

The poultry industry, whether its end is eggs or meat, is one long series of culling. Culling starts with the eggs. First, only eggs from known producers are selected and from these are culled the small, misshapen and off-colored ones. Then, when the egg is hatched, all weak and crippled chicks are culled. Then, if eggs are the goal, the pullets are separated from the cockerels (see "Chick Sexing," Farm Quarterly, Autumn, 1947) and again the pullets are periodically culled as they develop. All slow developing ones, which indicates they are low in vitality, are thrown in with the broilers for sale as meat.

When the pullets are ready to go into winter quarters they should be culled again. At this time the breeders who keep their birds in the confines of breed standards discard all that show disqualifications for their breed and variety and those that fall below standard in vigor. The average

THE MOLT of the primary wing feathers is a moderate indication of a laying vacation. They are shed in definite order and a study of their growth shows length of vacations. Note the axial or thumb feather dividing the primary feathers.

farmer and poultryman will want to keep all the pullets that have the proper body size, vigor and vitality to give them possible future profitable egg production. Vigor is essential if the birds are to produce eggs capable of hatching vigorous chicks. Vigor is also essential in a profitable egg production.

Even after these preliminary cullings your selected flock of layers will contain approximately one-third which will not lay enough eggs to warrant keeping them a second year. During the summer of the second year they should be culled again two or three times. Few hens will survive the second year of production. Therefore, if you have hens in your flock over two years old the chances are that they are more of a luxury than an asset. These should be carefully culled.

Age is not the only factor in laying performance. The best of layers, if improperly fed, or not fed a balanced ration, or are diseased, or are infected with lice and mites, will fall off or stop laying. Insufficient water will often result in a slump in laying. Close culling should be done in July, August, and September. Almost all young healthy hens will spurt in egg production during the spring months. When the hot months come the poor producers fall off. In poorly bred flocks and in flocks which are fed by hit-and-miss methods and flocks which are left to fend for themselves, this drop may come as early as June, depending, to some extent, on the time they are hatched. If your flock is culled about the first of July the second culling should follow four to six weeks later. The first culling weeds out those that are definitely poor producers. The second culling further adds quality to the flock and if the third is necessary it prepares the flock for the profitable winter season.

Many Southern farmers wait until January or February to cull their flocks. Some hen experts consider this to be a bad practice because, at this time, practically all are coming into, or are already in, production. The flock cannot be culled with any assurance that the poor layers are being removed. This culling catches only the birds that are off color or have some breed disqualifications and these defects do not affect egg production.

How To Cull

The writer of a famous old English cook book was a realist. Before giving his recipe for curried rabbit he prefaced it with the following advice: "First, catch your rabbit." This might well be the introductory advice on "How to Cull." First, catch your hen. This may not be as easy as it appears to be. Any farm wife who has chased a hen, scheduled for Sunday dinner, all over the farm knows that it takes more than agility and a sound heart. She knows also that if she were to try the same methods on her laying flock, even if they are in a pen, it would result in so much excitement that laying would fall off for several days. There are several methods of catching your hens without doing them harm. One is to rig up a trap set at the opening of the hen house; another is to use a catching hook; and another is to visit the hen house at night with a flashlight and pluck the sleeping hen off the roost.

Since culling involves a close examination of the fowl and since she will prob-

ONE OF THE WAYS to catch a hen is with a wire hook. Like running them down, it gets the flock excited and might cause a vacation. A better way is a trap pen set at the door. Hens can be taken from the pen without undue disturbance.

A CULLING CHART*

JUDGING FOR PRESENT PRODUCTION

	Laying hen	Nonlaying hen
Vent	Large, dilated, oblong, moist	Small, contracted, round, dry
Pubic bones	Flexible, wide apart	Rigid, close together
Comb	Large, red, full, glossy	Small, pale, scaly
Wattles and ear lobes	Prominent, soft, smooth	Inconspicuous, rough, and dry

JUDGING FOR PAST PRODUCTION

	Long-laying period	Short-laying period
Vent	Bluish-white	Flesh-colored
Eyelids	Thin, and edges white, prominent, keen, sparkling	Listless, sunken
Ear lobes	Enamel white	Yellow-tinted
Beak	Pearly white	Yellow-tinted
Face	Cleancut, sunken	Full, well-fleshed, yellowish
Shanks	White, flat, thin, creased	Yellow, round, smooth
Plumage	Worn, soiled, lifeless, close-feathered	Signs of molting, loose-feathered

JUDGING FOR RATE OF PRODUCTION

	High rate	Low rate
Keel	Slopes downward	Slopes upward
Pubic bones	Tips thin, points straight	Tips thick, curved in
Capacity	Four to five fingers	Two fingers
Abdomen	Soft, pliable, dilated	Fatty, hard, contracted
Rump	Broad, width carried back	Narrow, cramped
Skin	Soft, thin, loose, silky	Thick, dry, underlain with fat
Lateral processes	Prominent, pointed outward	Hard to find, pointed inward

JUDGING FOR PERSISTENCY OF PRODUCTION

	High persistency	Low persistency
Time of molt	In September or October and molts rapidly	In June or July and molts slowly
Wing molt	Drops 3 to 5 or more primary feathers at one time	Drops 1 or 2 primary feathers at once
Laying period	Eleven or twelve or more months of continuous production	Short-laying period accompanied by early and slow molt
Plumage	Worn, soiled, lifeless, and close feathered	Signs of molting and loose-feathered

* From Kansas Agricultural Experiment Station Circular 147.

ably object to the intimacies that culling entails, it is a good thing to know how to hold her with the minimum damage to her self respect. One of the reasons a hen struggles when she is caught is because she is afraid of falling. If you can set her mind at ease on this point she will probably settle down and might even give a contented cluck or two in your hands. Place her on the palm of your hand with her tail pointing away from you, allowing the fingers to extend around the legs with the index finger between them and with her head under your arm pit. This keeps the lady comfortable and enables the operator to examine the important parts of her laying mechanism.

It has been found that body measurements are of little or no value in determining the number of eggs a hen will lay. Laying depends on breeding rather than type or body conformation. To determine whether or not a hen is laying the following points are investigated and the sum total of the results will indicate, with a high percentage, the laying hens from the loafers: (1) the molt, (2) the comb, (3) the vent, (4) the pelvic bones, (5) coloring, (6) body and head conformation, (7) disposition.

The architecture of a hen has been carefully and scientifically studied. The professors have found that feathers usually follow a uniform pattern. The feathers of the wing grow in two groups, primary and secondary, separated by an axial, or dividing feather. There are usually ten primary wing feathers in each wing. The first feather to drop is the one next to the axial feather. In early molters, about two weeks after the first primary is dropped the second one is dropped, and at two week intervals each subsequent one drops. Hence, the length of time a hen has been molting can be determined, as it takes six weeks for the first primary dropped to mature and two weeks for each succeeding one. Two-thirds of this growth is made during the first three weeks, and the other third during the last three weeks. From the length of the new feathers the length of time the hen has been molting can be estimated. For instance, if the first primary feather is almost full length, the hen has been molting for about six weeks; if two-thirds grown, molting has been going on three weeks.

In high-producing hens, which are late molters, instead of the primary feathers dropping one at time, as in early molters, a group of two or more may drop at the same time. When such a condition is found, all the feathers of the same length are considered as one in determining the length of time of molt. Thus, the low producer and early molter is a slow molter; while the high producer and late molter is a rapid molter, so that she usually goes naked from dropping nearly all the feathers at one time. The best layers may therefore look the worst, like they have just been caught in the lawnmower, while

THE DEAD END KID on the left, even at her early age, knows she has no future. Her build isn't right for a layer and she runs to neck. The purebred on the right has promise.

the slow molters will present a comparatively neat appearance all through the molting season. Molting lasts from six to twelve weeks, and a hen seldom lays during molt.

A hen that is in heavy production will have a warm, full, red comb. It will be plump and very apparently full of blood. The wattles will also show the same characteristics. When a hen stops laying the comb tends to dry down and a whitish scurf usually forms; this is cold to the touch.

In a layer the vent tends to be moist and enlarged; small and puckered in a non-layer.

The conformation, size and condition of the abdomen gives the poultryman the most dependable pointers on whether or not the hen is laying. In the layer the abdomen is enlarged. In a non-layer it is contracted. The layers have soft pliable abdomens while the non-layers have hard abdomens often covered with hard fat.

The pelvic bones (sometimes called pin or lay bones and located on each side of the vent) are usually two to four finger widths apart in the layer but close almost together in the non-layer to about one finger width. The distance between the pelvic bones and the rear end of the breast bone usually measures three to five fingers wide in the layers, but only one to two fingers in the non-layers.

While these measurements, which can be taken quickly, are indications that the hen is producing, or has recently been producing heavily, they are not absolute. Sometimes in aged birds the body conformation is rigid and after a hen has quit laying it does not alter to any great extent.

If you have a yellow-skinned breed you have another check on laying. Yellow-skinned breeds, when not laying, store up yellow pigment in the shanks, beak, and skin. During a period of laying this pigment does not go to the outer layer of skin, but is deposited in the egg yolk. The longer a hen lays the more faded she will appear. Those hens which in July and August show yellow pigment in the parts named below are the non-layers; those hens showing no yellow color are the layers. A hen which has not been laying for a number of weeks will show yellow shanks. This gives a very accurate means of culling out the loafers.

When the birds start laying the pigment fades from parts in the following order:

Vent: The yellow color around the edge of the vent will usually leave with the first few eggs laid.

Eyelids: The eyelids will fade just a trifle more slowly than the vent.

Earlobes: The earlobes in Leghorns will fade almost as quickly as the eyelids.

Beak: The beak gradually fades from the base out toward the tip. In most hens

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FLAX

BY RICHARD E. STOCKWELL

Egyptians wrapped Mummies in Cloth made from Flax Straw. Today a lot of Flax Straw goes to wrap Cigarettes. Versatile in its uses, Flax is finicky in its growing Habits.

AMONG old-time farmers flax was called a bum and a gypsy. Nearer the truth would be to call it a pioneer, for in its early days, when it was following the westward wave of farmers across the country, it was restless and a rover, staying only a few years in a community, then moving on. It demanded clean, virgin soil. Old fields replanted to flax gave decreasing crops and finally failed entirely. It got a bad reputation, and farmers said it did something to the soil.

The truth is that it wasn't the fault of the flax at all, but of a disease which farmers knew nothing about. It had to keep ahead of the deadly flax wilt, a fungus which contaminated old fields. It appeared that eventually the crop would be pushed off the edge of the continent into the Pacific Ocean and that flax production in this country would cease.

Then fifty years ago, H. L. Bolley found what caused flax wilt, a soil born fungus which he described and named *Fusarium lini*. He developed a wilt-resistant flax and the crop came back and settled down as a permanent one in the north-central states. Later it made another movement, a long hop, from Mandan, North Dakota, to the Imperial Valley of California. From California it migrated to Arizona. Since it is a cool weather crop, it was found that planting in October and November in the Imperial Valley permitted growth during the winter months. It throve mightily in California and Arizona and the region now is one of the highest producers in the country. The world record for yield of flaxseed is held by Paul Harrison who in 1947 produced 64.9 bushels per acre on a 19.6 acre field. He had never raised flax before.

Flax is a slender, delicate plant that grows to a height of two or three feet. It branches at the top and on each of the eight or ten slender stems appears a light blue flower about the size of a two-bit piece. These flowers look something like forget-me-nots. They open at sunrise and the petals fall before noon. A field of flax in bloom is a heart-warming sight. When the seed bolls ripen they are the size of a pea and each holds about ten seeds. The bolls are tough and not easily shattered.

From Colonial times to the Civil War, its production was centered in Pennsylvania, Connecticut, New York and New Jersey. By 1860 the center had moved to the Miami River Valley in Ohio when half of the national production came from Ohio and Kentucky.

The crop continued its migration, and along with the covered wagon broke out onto the broad prairies of the Midwest. By 1879 Illinois led the nation in flax production only to be surpassed two years later by North Dakota. And there the crop has found its happiest home, on the wide, fertile plains with their deep, rich soil and cool summers.

Except for a few thousand acres in Oregon, where it supports our only linen textile industry, fibre flax no longer is grown in this country. Instead, we grow flax today for its seed.

North Dakota, with the largest flax acreage, and Minnesota, with the greatest total production, vie for the lead, and along with South Dakota, Montana, and Iowa, form the heart of the "flax belt," producing 85 per cent of the nation's flaxseed. Important acreages are found in California, Kansas, Texas, Arizona, Wyoming, Oregon, Idaho, and Ohio, and some flax is grown in practically every state.

Likes Cool Weather

Two things have an important bearing on where flax can and is grown in the United States. First, flax is a cool weather crop. Unless it has bloomed and the seed set before the hot summer weather, it is literally "cooked" in the field. Cool weather during the growing season and good flax yields go hand in hand.

It is true that huge flax yields are found in the Imperial Valley of California, which many people think of as a great out-of-doors hothouse, but flax is a winter crop in the Valley, as it is in Arizona and southern Texas. It grows during the cooler months of the year and is harvested before the hot weather comes to stifle it. In Kansas 100,000 acres of it are grown as a spring crop, with seeding starting as early as the last of February.

In states such as Illinois, Indiana, Ohio, Missouri, Kentucky, and Tennessee, it runs into hazards of meeting up with a hot spell that could ruin the crop, or cut down yields and make it unprofitable.

Another factor is that in many of the important farm states of the Midwest, flax comes into direct competition with corn and soybeans, both of which make excellent yields in the hot weather areas but do not do as well as flax in the cool weather areas. For this reason, most flax is grown in the northern tier of states of the Midwest. Canada is an important producer of flax for the same reason.

Farmers on the border of the flax country accept flax as a possibility, but are indifferent about making it a part of their permanent program. C. M. Manchester of Lake View, Ohio, is typical of the borderline cases. Manchester planted 230 acres in flax last summer. "I'm rather neutral about flax," he said. "I planted it last year mostly because of the $6.00 floor that the government put under it." If his yield is near the 17-bushel average that he harvested in 1943, he has nothing to worry about. But he remembers that in 1944, when his crop was plagued by weeds and wet weather, he harvested only six bushels per acre. Farmers like Manchester will grow flax when prices are high, but switch to other grains if flax doesn't promise a profit. He says labor costs are low, about the same as for oats, but he doesn't like the plant's vulnerability to weeds.

As long as there was rich, uncontaminated, virgin soil to break and favorable weather conditions prevailed, yields of flax were high and farmers made money on the crop. They had a long run of good luck. At one time or another, almost every crop has had its bad years and flax was no exception.

Those who ran out of new land about the turn of the century discovered that fields which had brought them 15 to 20 bushels per acre no longer produced a profitable crop. They tried it again, and didn't get enough to harvest. By 1900 many loyal flax growers had been forced to turn to wheat and other grains and the flax industry faced a crisis. They assumed that flax sapped soil strength.

This explanation didn't satisfy H. L. Bolley, botanist at North Dakota Agricultural College at Fargo. He believed it was something other than depleted soil that was working on the flax. At the Agricultural Experiment Station at Fargo, on a famous experimental plot of land—known as "plot 30"—he made some important discoveries. There flax wilt, a fungus that had committed serious depredations in Russia, Belgium, Germany, the Netherlands, Ireland, France, Japan, South America, and probably in other countries was finally trapped, identified, and stripped of its deadly power over flax.

Bolley Nails The Wilt

In 1900 Professor Bolley found that yields dropped precipitously on land where flax had been grown successively for several years because wilt, a parasitic fungus that infested the soil, sapped the life from the growing plants. By then flax wilt had become widespread in the upper Midwest. He set out to find a wilt-resistant strain of flax. Experimental plot 30 contained plenty of wilt fungus. Most of the flax plants in it died, but a few lived and these hardy plants were the ones in which Bolley was interested. In 1902 he harvested these scraggly, sickly flax plants, though they had produced only a few ripe seeds.

During the winter of 1902-1903, samples of flax seed from many sources were planted in botanical greenhouses in flax-

FLAX IS A CROP for the good soil. Some farmers who normally plant no flax can now grow it at a profit because of the $6.00 floor placed under it by the Government. With new wilt resistant strains the biggest problem is weed control.

sick soil from plot 30. Among them was seed saved from the scraggly plants on the plot 30 plantings of 1902. From all this seed, the only ones that produced a stand were those survivors from plot 30.

Professer Bolley then set out to find a wilt-resistant strain of flax by saving seed from plants that survived on the most disease-ridden ground known to man, Bison, a resistant strain, was produced after long experimentation and the flax crop was saved for American growers. Since then many other wilt-resistant and rust-resistant varieties have been developed.Thanks to Bolley's foresight and persistence, flax soon was flowing again from fields that hadn't produced a respectable crop in 20 years.

Today it is a one hundred million dollar crop in the United States. In 1947 the government asked farmers to plant five million acres to flax and that probably won't meet the growing demand. With America building thousands of new homes and with industrial uses greater than ever, flax promises to set new income records for itself as a cash crop.

Market Is Good

In 1947 industry estimated it would need 813,700,000 pounds of linseed oil. Over 82 per cent of this went into paint and varnish, while another 15 per cent of the total supply was used for oilcloth and linoleum. It is indispensable in printing inks. Linseed oil is used in making coated fabric, waterproof fabric, shade cloth, cleaning polish, floor wax, patent leather, shingle stain, brake linings, and shortening.

A bushel of flaxseed yields nearly 2½ gallons of linseed oil and about 36 pounds of linseed oil meal. Each year farmers use more than a million tons of linseed oil meal. Dairymen feed it as an extremely valuable protein supplement and regularly pay more per protein unit than they do for other supplements. Beef cattle feeders have a high regard for the oil meal because it produces fat beef in a hurry. The principal outlet for linseed oil meal is the beef and dairy herds right in the area where the flax is grown.

There is virtually no waste in the flax crop. The straw goes into cigarette paper, fine stationery, paper currency, rugs, and insulation material.But only a few years ago the tough, fibrous stems were burned after the seed was harvested. There was no satisfactory method for disposing of the straw, and it rotted slowly when turned under. Now, flax straw represents a clear profit.

"I'm Misunderstood," said Flax

When farmers get together and the talk gets around to flax there is bound to be disagreement, for it is a much misunderstood crop. Some consider it a problem crop and plant only when prices are high. They make no provision for it in their regular production program.

Cecil Baughman of Marathon, Iowa, for example, will tell you that he is all through trying to raise flax. He seeded a small field to flax last year; a sort of "pilot planting" to test the crop. Alfalfa was seeded with it. The planting was done late, after "the other crops were in" and with no more than the usual seedbed preparation.

The results were disastrous—for the flax, the alfalfa, and Baughman. He raised a beautiful crop of pigeon grass. The flax was hard to find among the weeds and the alfalfa failed to show up under its "nurse crop" of pigeon grass. Baughman is all through trying to grow flax.

Most of those who have had "bad luck" with the crop have failed to give enough thought to weed control. Other reasons for taking a loss on flax can be poor seedbed preparation, or just a poor season.

Other farmers, who plant flax every year, will argue long in its favor. Flax does require scientific farming; good cultural practices combined with careful planning remove the risk and make it a dependable crop. It requires a cool growing period; therefore it is not well suited to a humid and hot climate. It's a winter crop in California and Arizona.

Where To Plant

When choosing a field for planting flax, a careful farmer considers four things: Fertility, freedom from weeds, drainage, and past history of the field.

He knows that for maximum growth flax needs good soil—preferably loam or clay loam—and plenty of moisture. It doesn't do well on sandy or gravelly soils. The best evidence to date indicates fertilizers benefit flax most if applied to crops preceding it. Commercial fertilizers affect flax crops for several years following their application. As for barnyard manure, it is a carrier of weed seeds and therefore a cultivated crop should be grown after its application to destroy the weeds before flax is sown. Flax farmers say flax is a sissy when it comes to weeds and does best when planted in a field known to be relatively free of them.

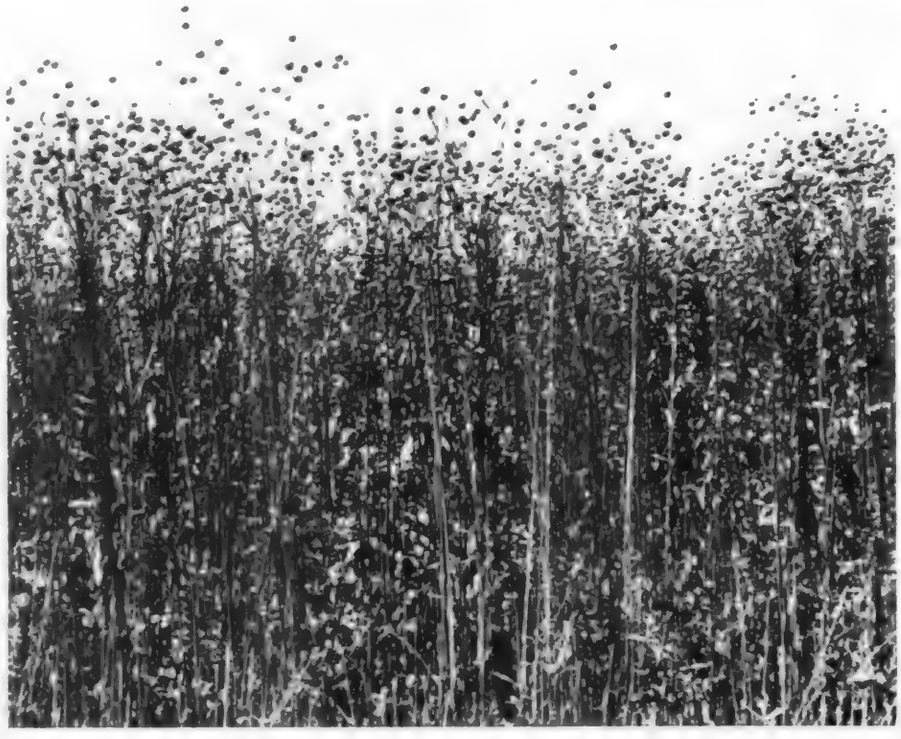
Well-drained soil is important chiefly because you have to get into the field early in the spring and get your flax started in time to beat the weeds.

Because the cultivation of soybeans and corn destroys most of the weeds, they are good crops to precede flax. When flax follows these two crops, the need for plowing often is eliminated. Shallow working of such fields two or three times in the spring provides a fine, firm seed bed. When oats or barley fields are plowed and worked down in August and weeds allowed to sprout, they are also good crops to precede flax.

Pave The Way

Increased flax yields will more than compensate for the extra time necessary to prepare a proper seed bed. Cornfields should be double-disked in the spring to cut up stalks and stubble. If fall plowing is possible, it should be based on whether the ground now exposed, or the soil which will be turned up, will have less weeds. Land plowed in the fall requires spring disking, harrowing and culti-packing before seeding. Soybean fields kept weed-free are readily prepared by light surface disking or harrowing in the spring, according to the condition of the soil. Working the soil often turns up weeds, so plant early to give flax a head start. Small grains should be plowed in August and harrowed imme-

WHEN MATURE the flax plants head up in bolls which are tough enough to protect the seed from shattering. Bolls are about the size of a pea and hold an average of 10 seeds each. The seed is the money part of the crop but straw is also sold.



diately. Hay or pasture land should be treated the same.

August plowing is one of the best ways to clean up the top two inches of soil and reduce weeds which would otherwise cut yields the following season. It brings weed seeds that have passed their dormancy period to the surface at a time when temperature and moisture conditions are usually favorable for sprouting. The exposed weed seeds are given a chance to sprout and be killed by frosts before they produce seeds.

Before planting, the seed bed should be worked shallow. Drag it so it's smooth and well-packed. Very loose soil should be culti-packed both before and after sowing.

Flax should be your first crop in the ground. Fields planted as soon as the land can be properly prepared may be expected to yield about 25 per cent more per acre than those sown 10 days later. There has been a big swing toward early planting and soil packing in the past 20 years because of the increased yields they bring. Modern methods of shallow spring working—not more than two or three inches deep—make it possible to sow flax at oat-planting time. This gives it a head start on weeds and an opportunity to develop before hot weather.

Flax seed is quite small and like other small seeded crops, requires care in planting to secure a good stand. Seed placed in a firm, smooth seed bed germinates and grows more rapidly. Prompt germination is helped by culti-packing before and after seeding, a practice that brings the moist soil in direct contact with the seed. Drilling usually is preferred to broadcasting because it results in more even distribution and a more uniform depth. Best results are obtained when seed is drilled to a depth of one-half to one inch. Under average conditions small seeded varieties such as Redwing should be planted at the rate of 35 to 40 pounds per acre. Large seeded varieties like Dakota, Crystal and Koto require from 40 to 50 pounds per acre. In drier sections, lower rates of seeding prevail. Actual seeding rates should be adjusted according to purity and germination.

Farmers going into flax growing for the first time will find their county agents good fellows to talk with about seeding rates and varieties best suited to their part of the country. It is always wisest to buy certified seed to assure varietal purity and protection against noxious weeds. Flax can be used very satisfactorily as a nurse crop for alfalfa, clover, other legumes and grass mixtures. Thus, it works well into most crop rotation practices.

Weeds — A Deadly Enemy

Experienced flax farmers attribute good yields to weed-free seed, and that extra bushel they're likely to get, more than offsets the cost of having the seed cleaned by a commercial establishment.

Clean flax brings no weeds to the field, but because the slender plant doesn't shade the ground as well as other grains, weeds present in the soil grow rapidly.

FLAX STRAW is often returned to the farm as cigarette papers but flax itself returns little to the land. It is a cash crop that drains soil fertility.

Destruction of many annual broad-leaved weeds with new chemical sprays has increased yields on some fields from two to ten bushels an acre. These sprays, Sinox and Dow Selective Weed Killer, destroy many weeds without materially affecting healthy flax. Although the exact increase depends on the original weediness of the field, chemical weed spray tests on nineteen upper Midwest farms showed an increase on the average of 4.5 bushels of flax per acre. Large scale use by growers has verified the results obtained in these tests. Both sprays kill broad-leaved weeds such as wild mustard, wild buckwheat, pigweed, lamb's quarters, and sunflowers in about three or four hours.

In addition to higher yields of both flaxseed and straw, the use of weed spray makes harvesting easier and since weeds killed by spray do not reseed, cleaner ground is available for future crops.

A hundred gallons of water in which the recommended amount of Dow Selective Weed Killer or Sinox has been dissolved will spray nearly an acre and a half of flax at a cost of $3.50 to $3.75 an acre for the spray alone. Spraying is most effective when weed sprouting has reached its peak. Normally this is at about corn-planting time when flax is four to six inches high. Spray only when temperatures are between 65 and 85 degrees, when there is no dew on the leaves, and when rain is not expected for two to three hours.

Chemical weed sprays should not be used on fields where flax is serving as a nurse crop for alfalfa, clover, or other legumes. Because pigeon grass and other narrow-leaved, grass-type weeds are not destroyed by the two sprays, their use constitutes only one part of the complete weed control program.

Flax has few insect enemies. If grasshoppers were prevalent the previous year, fields selected for flax should be those which do not harbor large stocks of grasshopper eggs. Timely and repeated spread-

ing of poison bait on field margins and roadsides eliminates young grasshoppers before they move into the crop. Flax is a good crop to sow between fields of small grain and corn, for it is a cinch bug barrier.

It Has Ills

There are diseases that attack flax, but they can be readily controlled. In the case of wilt, the answer is, of course, to sow only wilt-resistant varieties of which many are available. Flax rust is spread from old straw and standing stubble of the previous year. Last year's stubble which may be infected should be plowed under. To further protect your crop from rust, don't plant flax on the same field two successive years. Many varieties are immune to common rust and others are rust resistant.

Pasmo, another fungus disease, attacks the leaves and stems and shows up as a greenish-brown mottling of the stems that soon kills the plant. It is carried on both flaxseed and straw. Thorough seed cleaning and treatment with fungicidal dust helps to control pasmo. New Improved Ceresan at the rate of one and a half ounces per bushel or Arasan at the rate of one ounce per bushel will protect seed against seedling blights. Treatment costs little and is a good investment for it protects the crop against seed and soil borne blights that destroy stands and cut yields. The handiest time to treat flaxseed is when it is being cleaned.

Harvest Carefully

Flax is less expensive to havest than other grains. Though the cash income from an acre of flax exceeds that of other grains, there are fewer bushels per acre . . . and therefore, less to handle.

High returns demand proper handling at harvest-time. This means cutting the crop when top yields are obtainable and mature quality is assured, and separating seed under proper conditions to get the seed produced into the grain bins. Here are some harvest pointers:

1. Cut when bolls are brown and stems begin to turn yellow.
2. Harvest promptly to avoid rapid weed growth which occurs after the crop is ripe.
3. Tie in small, loose bundles to hasten drying.
4. Use a sickle with smooth knife sections.

What Variety?

There have been strains of flax developed for every part of the country where the crop can be grown. These are designed to do best in a particular locality because of varying conditions in climate, soil, and prevalence of disease.

Dakota is a new, high-yielding variety that is both wilt and rust resistant. It has wide adaptation to differences in soil and weather. It grows rapidly and is recommended in Montana, North Dakota, South Dakota, Minnesota, Iowa, and Canada.

Arrow is a sister selection of Dakota. It appears to be well adapted to the drier areas of eastern Montana and western Minnesota. It is both highly rust and wilt resistant.

Sheyenne is a new variety recently released by the North Dakota agricultural experiment station. It is recommended where an early maturing flax is desired, though it does not make high yields. It is highly resistant to rust and wilt.

Minerva is a new variety released in 1947 by the Minnesota Agricultural Experiment Station. It is only moderately resistant to wilt and rust, but outstanding in oil content.

NO SPECIAL MACHINERY is needed for flax farming. Most combines will handle the harvest if they get a new set of rollers made especially for flax. When bolls are brown and stems begin to turn yellow it's time to harvest and beat the weeds.

Koto is one of the newer varieties grown extensively in Minnesota and the Dakotas. High-yielding and wilt-resistant, it first was thought to be rust resistant, but later susceptibility to one or two prevalent strains of rust was discovered.

Crystal is a yellow-seeded variety developed by the Minnesota Agricultural Experiment Station and is recommended for northwestern Minnesota. Only fair in yield, it is very rust resistant and only moderately resistant to wilt.

Victory is one of the early rust-resistant varieties and is grown extensively in North Dakota. It gives a fair yield.

B-1528 of North Dakota is a high-yielding, rust-resistant variety that is especially adapted to the northern Red River Valley. It is a little slow to reach maturity and must be seeded early.

Royal is a Canadian variety that has been grown extensively in North Dakota and Montana. It is rust resistant and moderately wilt resistant. The disadvantage of Royal is the poor quality of its oil for paint.

Redwing is an older variety now grown to a limited extent in southern Minnesota, Iowa, and Wisconsin.

Redson is a selection from a cross between Redwing and Bison that was first released in Wisconsin where it is grown today. It is similar to Redwing.

In Texas, nearly all flax is grown in a triangular area bounded by Houston, San Antonio, and Corpus Christi. The two varieties which are raised as a winter crop are Rio and Viking.

In California, Punjab is grown almost exclusively under irrigation as a winter crop in the Imperial and San Joaquin Valleys. Punjab gives outstanding yields. It is not recommended for the North Central states.

In Arizona, the picture is the same as in California. Punjab is grown under irrigation in Yuma County and in the Colorado Valley.

In Kansas, the two varieties raised are Bison and Linota.

In Oregon, fiber flax is about all the flax that is raised and is grown only in the Willamette Valley. The only certified fiber flax in Oregon is Cascade.

There is such variation in varieties in different parts of the flax growing area that one of the first things to do when planning a flax crop is confer with the county agricultural agent, or other local authority on the best flax for your farm. Proper selection of the strain to be planted is essential to success. Failure to obtain a wilt-resistant strain in a locality where the wilt is common, or the highest yielding strain for the area are factors leading to early discouragement.

Farmers on the border of the flax country can now plant flax and expect a profit, if their land is right for the crop and they follow good weed control practices. This is the best opportunity farmers have had to bring flax back from the west.

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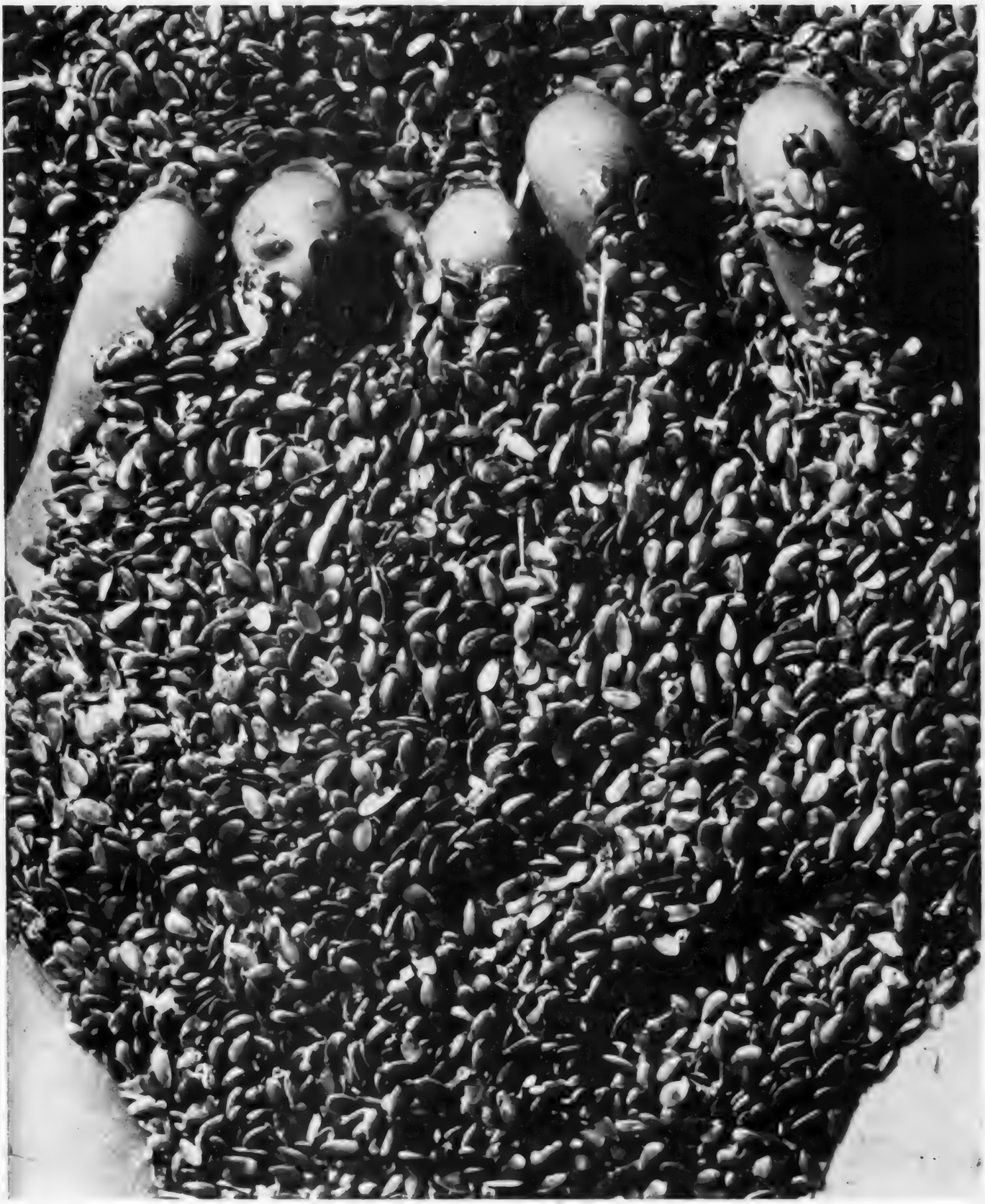
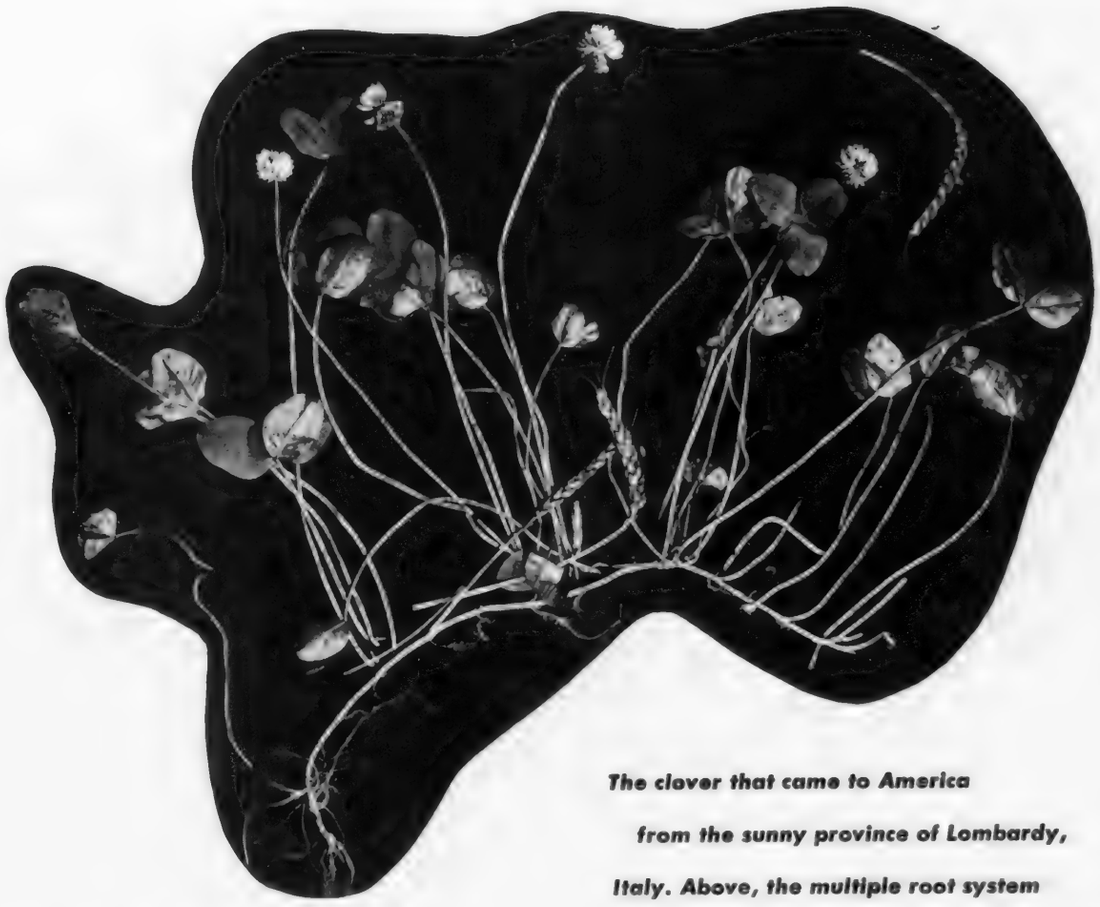


FLAXSEED, that mother once used for poultices to draw out boils, or dropped singly into her children's eyes to remove foreign objects, is not restricted to these domestic uses. The big demand for this farm crop stems from its use in the paint industry. Linseed oil is the only oil available in volume that needs no expensive chemical treatment before it can be used in paints. The products of flaxseed also go into linoleum, oilcloth, printing inks, and shortening. A yield of eight to 10 bushels is good for much of the flax territory. Once harvested, the flaxseed must be cleaned to remove weed seeds before it goes to market.

A THICK MAT from a mixed seeding of alfalfa, brome and ladino. The field was limed and dressed with 300 lbs. of 3-12-12 per acre.



The clover that came to America from the sunny province of Lombardy, Italy. Above, the multiple root system of a single plant, with wheat tops for scale.

LADINO

BY EVART VANDER MEULEN

THERE are fashions in farm crops just as there are fashions in women's hats. The latest fashion in crops is Ladino clover, a perennial legume that has been knocking at the farmer's door for two score years.

It has been regarded as a fine forage plant, but for many years farmers believed it was too temperamental to waste time on. Once its requirements were understood, however, it blossomed into a favorite and is no longer thought of as a novelty.

Ladino is a prima donna, but a lady that is not too hard to please, and will return tenfold the love and devotion expended in its management. When its peculiar pasturage habits and its seeding requirements were fully understood it moved into direct competition with the other clovers and alfalfa and showed virtues no other legume possessed.

Ladino is to all pasture crops what alfalfa is to hay crops—the boss of them all. It is not a poor man's crop, nor a poor soil crop. To plant and fertilize it requires time and money, and to grow it requires good soil, but it responds like a thoroughbred with knee-high, lush, high-protein forage.

The origin of Ladino clover is not definitely known. It is possible that it developed by slow process of natural selection from its little brother, Common White clover. The seed was first introduced in this country in 1903 by the United States Department of Agriculture from the town of Lodi, in the province of Lombardy in northern Italy, which incidentally is where Napoleon started his career as a general. It had been growing in this region for over half a century prior to its arrival in this country.

Early experiments, made soon after it was imported in the eastern states, were not at all satisfactory. Later tests in Idaho in 1915, however, were more successful. Good crops of forage and seed were produced, commercial seed production was started in 1918, and it was soon growing successfully throughout the state. In 1916 Wisconsin station men used it on alfalfa land as a substitute for alfalfa. In these tests Ladino was compared directly with alfalfa as a hay crop. The results were quite discouraging, and this set-back caused Ladino to be shelved until 1942, twenty-six years later. It was then taken out, dusted off, and given a more thorough trial as a pasture crop. It made an immediate response and since that time it has become one of the most promising of all pasture legumes. Results of tests in New England and the Corn Belt have been equally successful.

Ladino clover is a rapid growing perennial legume closely resembling Common White clover. Yet it is easily distinguished from Common White by its much larger leaflets, taller stems and larger white blossoms. It spreads like Common White by means of surface runners or creeping stems, which are rather coarse, with short joints or internodes. Under favorable conditions a single plant may produce 6 to 10 or more surface runners which take root at the nodes so that even sparse stands will soon thicken and produce uniform, dense growth.

The leaves are borne on long leaf stalks and these together with the flower stalks grow upright from the nodes of the creep-

IN THE DEVELOPMENT of improved varieties of Ladino clover a laboratory technician in the U. S. D. A. uses vacuum to pick up the pollen from the anthers of one plant. This will be taken to the stigmas of other plants, for cross pollination.

Ladino may be broadcast or seeded with the grass attachment of a grain drill. A firm, moderately smooth seedbed is a prerequisite for getting the small seeds off to a good start. Very early spring is the preferred planting time.

ing stems. The leaf stalks grow rapidly, attaining a height of 10 to 20 inches, depending on soil and moisture conditions. If the leaf growth is grazed or clipped off at a height of 3 or 4 inches new leaves will develop quickly. Generally, complete recovery will occur in two to three weeks.

The farmers can reasonably expect to grow Ladino wherever Common White is adapted. This means that it thrives best on fertile, moisture-retaining soils, sufficiently drained to prevent standing water. It tolerates wet soil conditions equal to Alsike or Common White, and much better than alfalfa. With its much shallower root system, Ladino is not as drought resistant as alfalfa. It is capable of withstanding mild dry periods. It may stop growing but will recover after a good rain as quickly as any other forage crop. It is definitely not a crop for droughty soils or soils of low fertility.

Ladino grows satisfactorily on most kinds of fertile soils which are well supplied with organic matter and have the capacity of holding moisture. If your soil is not fertile, it is far better to strike Ladino off your list. Its lime requirement is similar to that of Alsike or White Clover, with an optimum pH range of 5.5 to 7.5.

Geographically, Ladino has a wide range of adaptation. It is being planted extensively in the northeastern states for pasture, hay and silage, doing best under cool, moist conditions. In the Pacific states, extending from California to Washington and the adjoining states, it is grown extensively for pasture and seed production, primarily under irrigation. In the central states it does well from northern Michigan to southern Louisiana. It has adapted itself to cool, short summers with cold winters of the North as well as the long, hot summers with mild winters of the South. In the South it is grown primarily for pasture. With sufficient moisture and fertility it has demonstrated its adaptability to much of the United States.

Soil Preparation And Seeding

The seed of Ladino clover is very small and requires a fine, firm, moderately smooth seedbed. A loose seedbed is almost sure to result in a zero stand of Ladino, resulting in rapid drying out of the soil and excessive coverage of the seed. When erosion is not a problem, fall plowing at moderate depths gives the soil time to settle and provides the desired firmness for spring seeding. When delayed until spring, plowing should be shallow and be followed with a weighted roller or packer to provide the desired firmness prior to seeding.

Shallow seeding is essential so that the small seedlings may not have far to go to emerge from the soil. It should not be seeded more than one-fourth inch deep. It can be broadcast successfully and rolled in with a corrugated roller or worked in with very light harrowing.

Seeding can be alone or with an early maturing companion grain crop, providing the companion is seeded at moderate rates.

Good stands are obtained when seeded with a spring or fall sown grain managed so that it does not compete too much with the clover seedlings.

It is desirable to seed Ladino as early in the spring as a good seedbed can be prepared. March is not too early. Early seedings germinate promptly and have a chance to become well rooted before the warm dry mid-summer period. Late summer seeding is hazardous but satisfactory if you have a lucky season and conditions permit good growth before winter.

As with any other legume, it is advisable and profitable to inoculate Ladino seed prior to planting, using the same inoculant as for Red, Alsike, or Common White clover.

Ladino seed cannot be distinguished from Common White clover seed. The farmer is advised to keep a sharp eye open for varietal purity, buying only certified seed or seed of verified origin.

A good stand of straight Ladino can be obtained with two to three pounds of seed per acre because of its strawberry-like habit of growth. In grass mixtures one to two pounds per acre is sufficient. However, if you want to buy insurance against a poor season, put in a pound or two more.

Ladino clover seed is often hard and unless there is a germination of about 50 per cent it should be scarified. Lower percentages of hard seed, to 50 per cent, are not objectionable, because the delayed germination of such seed may insure the establishment of a stand if part of the early seedlings are killed by unfavorable weather conditions.

Ladino normally grows quite slowly during the first month or two after seeding. Thereafter, growth is rapid when soil and moisture conditions are favorable. When spring planted the creeping runners may attain a length of 12 to 18 in. and the leaves a height of 8 to 12 in. by early fall.

Fertilizer Is Needed

The high production potentiality of Ladino clover indicates that it requires large quantities of available plant food, particularly minerals. It is a heavy feeder of phosphorus and potash. Being a legume it manufactures its own nitrogen with proper inoculation, although a small amount of nitrogen fertilizer helps in establishing a stand and supports the seedlings to the age where they can make their own nitrogen.

The amount and kind of fertilizer that should be applied at seeding time and at later top dressings depends upon the character of the soil and the previous cropping practices. Generally from 300 to 600 pounds per acre of 0-20-10 or 0-20-20 should be applied prior to seeding and worked well into the soil during the preparation of the seedbed. There is an alternate method. So well does it respond to heavy fertilization that 400 to 600 pounds of 20 per cent super-phosphate pays out. If there is a potash deficiency as well, about 200 pounds of muriate of potash in addition to the super-phosphate has been profitable. On soils somewhat below par in organic matter, an application of 3 to 6 tons of well rotted manure worked into the soil before seeding aids in rapid stand establishment and growth but it does not take the place of mineral fertilizer.

Top dressing of established stands of Ladino, preferably in early spring, may be necessary, not only in providing assurance for continued high production, but as a safeguard against severe loss from winter injury. This is accomplished by moderate applications at two to three year intervals of barnyard manure fortified with phosphate fertilizer or 200 to 300 pounds of commercial fertilizer containing phosphate and potash. The returns more than compensate for the cost of the additional fertilizer.

Ladino clover sells itself because it has a high proportion of leaves to the stem, and the leaves are very high in nutrients. At immature stages the plant contains 20 to 25 per cent crude protein; at maturity, 12 per cent and better. On a dry matter basis it is 15 to 20 per cent crude fiber, and about 60 per cent carbohydrates.

A Quality Feed

Ladino is exceedingly palatable at all stages of growth and highly relished by all classes of livestock. It is particularly desirable for dairy cattle and poultry because of its high-yielding, nutritious, high-protein feed values. It is also rapidly gaining popularity for hog and beef pasture.

Ladino clover is an excellent source of high quality protein hay, although it is more popular as a pasture crop. It makes a good hay but you need the weather man on your side when it comes to curing. When harvesting for hay, care must be exercised in handling to prevent shattering of leaves. The best time seems to be when about one-tenth of the flower heads have turned brown. Even at this state of ripeness the moisture content may be as high as 75 to 80 per cent. To alleviate the haying problem of high moisture content, it is wiser to grow Ladino in a mixture with other hay legumes or grasses.

A good quality silage from a mixture of Ladino clover and grasses can be made by allowing it to wilt in the swath and adding molasses or dried whey as preservatives.

Ladino's trump card is its fine performance as a pasture crop. The best pasture performance is obtained and the life of the established stand is prolonged when Ladino is permitted to make a good growth of 8 to 10 inches or more and then grazed down not lower than 3 or 4 inches. The livestock should be removed to other areas until the clover has again made a good growth. This is "rotational grazing," th

LADINO is a hard-working "interceptor." When summer rains come pelting down, its broad-shouldered leaves stop the big drops and let them down as a gentle mist.

Chickens, as well as most farm livestock do well on Ladino pasture. The range shelters should be moved frequently to avoid excessive pasture wear-and-tear.

THE THIRTY odd cows in the dairy herd of Manuel Medeiros of Bristol County, Mass., graze hip-deep in a mixed Ladino pasture that before treatment with lime, superphosphate and potash was mostly rocks and moss. Now there is more than they can eat.

practice of short periods of intensive grazing followed with rest periods, when Ladino goes up to 8 to 10 inches for repeated pasturing. Grazing animals should be removed from the Ladino field when 3 to 4 inches of growth remain. What appears to be under-grazing is most beneficial to the Ladino plant. Management of Ladino is entirely different from that of Common White clover. Close grazing of Common White clover-grass mixture is essential to the best productiveness of Common White, while with Ladino this would be most detrimental, resulting in delayed recovery, possible destruction of the creeping stems, weakening of the plant, and rapid encroachment of weeds or the companion grass. It is important to remember that close grazing of Ladino should be avoided at all times. It is a temptation for livestock men to disregard the hazard of grazing too closely, because at 3 or 4 inches the pasture still looks lush and plentiful.

Some idea of what Ladino will do in a pasture is indicated by tests made on a Michigan field in 1942. From May 25th to August 30th, a total of 34,415 pounds of green forage was produced per acre. During this period the clover was clipped seven times at two week intervals to a height of 3 inches. The average height of the forage at each clipping was 7.3 inches, giving a growth recovery of 4.3 inches per two week intervals.

The farmer with a good Ladino crop marvels at its high production and quick recovery. Under normal conditions of soil fertility, moisture, and age of stand, one acre of Ladino will furnish for a full grazing season sufficient pasture for 1 cow, or 10 to 12 hogs, or 12 to 14 sheep, or 400 growing chickens. To obtain this grazing productivity it is necessary to have the acre divided into two or three plots to provide for rotational grazing.

Ladino Has Its Faults

Ladino has two grazing disadvantages which should be thoroughly understood when pasturing. It is somewhat laxative and has a tendency to cause bloat. For these reasons and others, it is highly recommended that Ladino be grown with a good companion grass or grasses. These grasses should have growth habits that allow the Ladino to make maximum production with the least amount of competition. When grasses are used with Ladino it should generally be favored. Generally speaking Ladino puts its best foot forward when it is in company with other legumes or with grasses.

The grasses used depend on soil conditions and climate adaptation. The following grasses have proven to be good companions for Ladino: Orchard Grass, Smooth Bromegrass, Fescues (Meadow and Tall), Timothy, Dallis, Carpet and Reed Canary. Kentucky Blue Grass is sometimes used, especially for poultry pasture, but it does have a tendency to crowd out the Ladino when conditions are somewhat adverse for the clover.

Recommended seeding mixtures vary with the locality. Here are the mixtures and rate of seeding (in pounds per acre), recommended for north central states.

I. For fertile cultivated land with poor surface drainage

(1)	Ladino clover	1-2
	Red clover	4
	Timothy	4
(2)	Ladino clover	1-2
	Alsike clover	2
	Timothy	4
(3)	Ladino clover	2
	Bromegrass	6-8

II. For well drained fertile soils well supplied with moisture

(1)	Ladino clover	1
	Alfalfa	8-10
	Bromegrass	6-8
(2)	Ladino clover	1
	Alfalfa	6-8
	Red clover	3-4
	Bromegrass	6-8

III. For seed production on well drained upland soils

(1)	Ladino clover	3

Near Gracey, Kentucky, Henry V. Thomas is using Ladino clover with Kentucky 31 Fescue, a strain of tall Fescue, on some of his fertile, moisture holding-soils. He says with enthusiasm that both crops are very good grown alone, but a combination of the two produces for him the ideal pasture.

When there is from 30 to 40 per cent grass in the forage there should be little danger of bloat, although it is still advisable to use caution. Particular watchfulness is needed when cattle are first turned on such pasture, or when the clover is highly succulent from wet weather, or when it is wet from dew or rain.

There is an additional reason for recommending a Ladino-grass combination. The grass with Ladino provides effective insulation against alternate freezing and thawing of the soil, protecting the Ladino from winter injury. As another precaution from winter injury it is important to have the clover go into the winter with 5 to 6 inches of growth. In return the Ladino is beneficial to the grass, supplying liberal amounts of readily available nitrogen which is absorbed, increasing the protein content and palatability of the grass.

The management of Ladino should be such as to permit a small amount of natural reseeding each year. A comparatively few seed heads will do the job. This will help to maintain a good stand for a number of years, permitting some new seedlings to replace old mother plants that may die out because of winter injury, drought, grazing damage, or of old age.

Seed Production

The commercial production of Ladino clover seed is centered in irrigated areas of California, Oregon, and Idaho, with small, but rapidly increasing production in some central states. Seed production of Ladino should be approached with a thorough knowledge of conditions of soils, climate and management.

Last year over 1,000,000 pounds of seed was produced from about 25,000 acres. The demand in the last few years has been much greater than the supply, which has resulted in comparatively high prices, ranging from $2.50 to $3.50 per pound.

The seeding cost, however, is less severe

than it appears when considering the fact that only one to three pounds of seed is required per acre. The farmer may reasonably expect these prices to moderate as the supply of seed becomes more plentiful.

The usual procedure in the production of seed is to pasture off the early growth, removing the livestock from 4 to 6 weeks before the time when the maximum number of flowers is expected. The grazing or clipping of the early flush spring growth is conducive to free blooming and facilitates seed harvesting. Bright, warm, dry weather is also essential for abundant flowering and it is during this kind of weather that bee activity is highest, resulting in maximum pollination.

Ladino clover, like most other hay and pasture legumes, must be pollinated primarily by bees, both tame and wild, for seed production. Therefore, it is important to examine the field during blooming to determine whether bees are working the flowers. If bees are not plentiful it pays to set hives of honeybees in or near the field at the rate of one hive per acre.

Before harvesting a field for seed it is most profitable to examine the heads. If heads are plentiful and they contain an average of fifty or more seeds per head, the crop is satisfactory for seed harvesting.

Seed crops are cut when about 90 per cent of the heads are dry, brown and mature enough to thresh readily by hand. Cutting is done generally with a mower fitted with a windrow attachment. The cut clover is allowed to remain in the windrow until it is thoroughly dry and then threshed with a pickup combine or clover huller. Yields generally range from 25 to 100 pounds per acre, depending upon the various factors that influence seed production.

Ladino clover should be grown for seed only when fertility, elevation, moisture conditions do not favor excessive vegetation growth and yet where it can be utilized as pasture, hay or silage if indicated seed yields are low.

Advantages Of Ladino Clover

1. It is a perennial of medium long life.
2. It may be used in seeding mixtures including Red and/or Alsike clover and Timothy or Bromegrass to provide nutritious hay or pasture for two or more years and will last up to seven if properly managed.
3. It is high in protein, minerals and vitamins and low in fiber.
4. It is extremely aggressive under favorable conditions and retards the encroachment of most weeds and many undesirable grasses.
5. It provides an excellent ground cover which is effective in reducing water losses due to runoff and soil losses by erosion.

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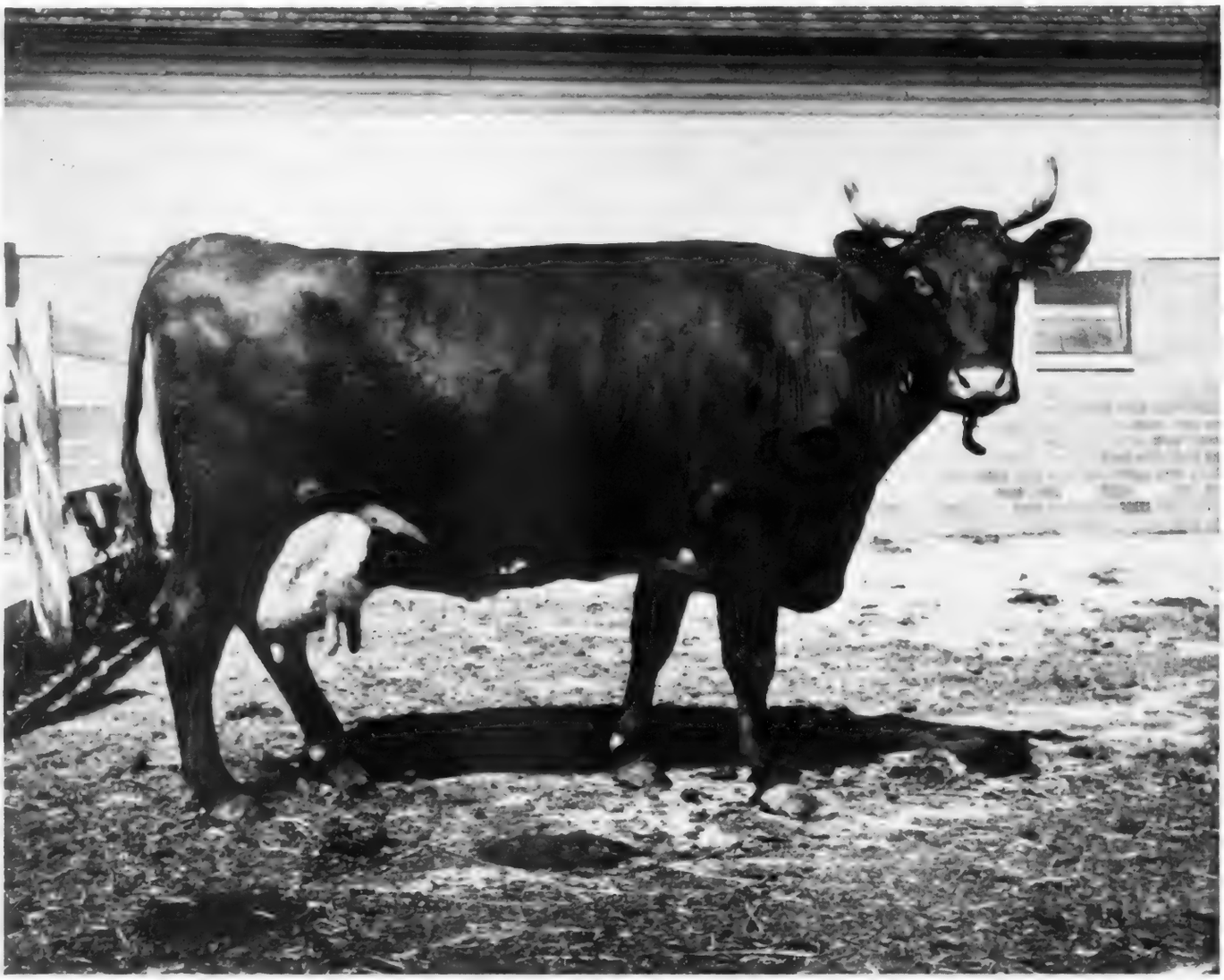
YOU NEED hot, dry weather and lots of sunshine to make good Ladino hay. The ideal mowing time is when approximately one-tenth of the heads have turned brown. For quicker hay-making it is best to grow Ladino in a mixture with other grasses. Once the hay is cured you work until "can't see" to get it in.



A HAPPY COMBINATION of beef and dairy qualities is displayed by Gladys IV, owned by the Mill Valley Farms, Romeo, Mich. Her record is 11,276 lbs. of milk and 445 lbs. butterfat at 9 years. Note the fine attachment of her udder.

THE MILKING SHORTHORN

BY W. J. HARDY

THE old family cow of our grandfathers was a Milking Shorthorn, but she was likely called a Durham. Until the dairy specialists came along most of the cows in this country were roan, red, or red and white, and they carried a generous amount of the Durham blood. The Durham, later to be called the Milking Shorthorn, served the country well, for she supplied beef as well as milk, both in generous amounts. Her breed went into a decline for a spell, but she is on the upgrade again, and her dual-purpose virtues are bringing her to the attention of the dairyman as well as the general farmer, whose favorite she has always been.

The First Hundred Years

Milking Shorthorn cattle are among the oldest of improved breeds in the world. The year 1946 marked the 100th year of registration of these cattle, the first of all breeds to be registered in the United States.

The breed originated in the Valley of the River Tees in northeastern England, at Durham in Yorkshire County. Durham cattle were among the first imported into this country. The correct breed name is Shorthorn. It was not until the founding of the organization now known as the American Milking Shorthorn Society, in 1920, that the name Milking Shorthorn was adopted to distinguish them from the beef type Shorthorn, because the bloodlines are as dissimilar as are those of other cattle breeds.

Thomas Bates, an Englishman, developed the first Milking Shorthorns. Cattlemen still speak of him with awe, for in 1873, when corn was selling for 28 cents a bushel and hogs were $4.00, an importation of Bates cattle set a record for prices that has scarcely been equalled even in this day of fancy sums for prize stock. The cattle averaged $18,000, with one cow, 8th Duchess of Geneva, selling for $40,600. This was at the famous New York Mills sale in 1873. Soon after came one of our periodic depressions and for a decade the development of livestock took a slump. The Bates Shorthorn blood infiltrated up and down the land into farmers' herds but only a few breeders kept up registration. Herds of purebred Milking Shorthorns increased only slowly.

By the time World War I came, the country was full of grade Milking Shorthorns and other dairy cows of the Durham type. Many Milking Shorthorns were crossed with the popular Scotch Shorthorns, a beef type, and lost their dual purpose characteristics. Their virtue as a beef animal was their undoing at that time.

Farmers could not withstand the pressure of high war prices. Their "Durhams" were worth top price for beef as they fleshened up for freshening, and the price paid for them (as much as 25c per pound) meant that they could sell their 1600 pound cows at a figure that would buy them two grade dairy cows to put in the dairy and get the high price for milk. That two-for-one deal looked good at the time to a man who was willing to milk cows. The man who did not care to milk naturally took to the beef types.

This depleted the "Durham" herds almost to the vanishing point. There were but few pioneers who kept the faith and held their herds intact. At one time, during World War I, there were less than 100 herds of purebred Milking Shorthorns. Farmers who had gone over to the Jerseys, Guernseys, and Holsteins found they were not so well equipped to specialize, and began to realize that they had killed the goose that laid the golden egg by selling their "Durhams" for beef. Their Milking Shorthorns represented much more money in salvage value as beef when their value as milkers gave out.

The Organization of Breeders

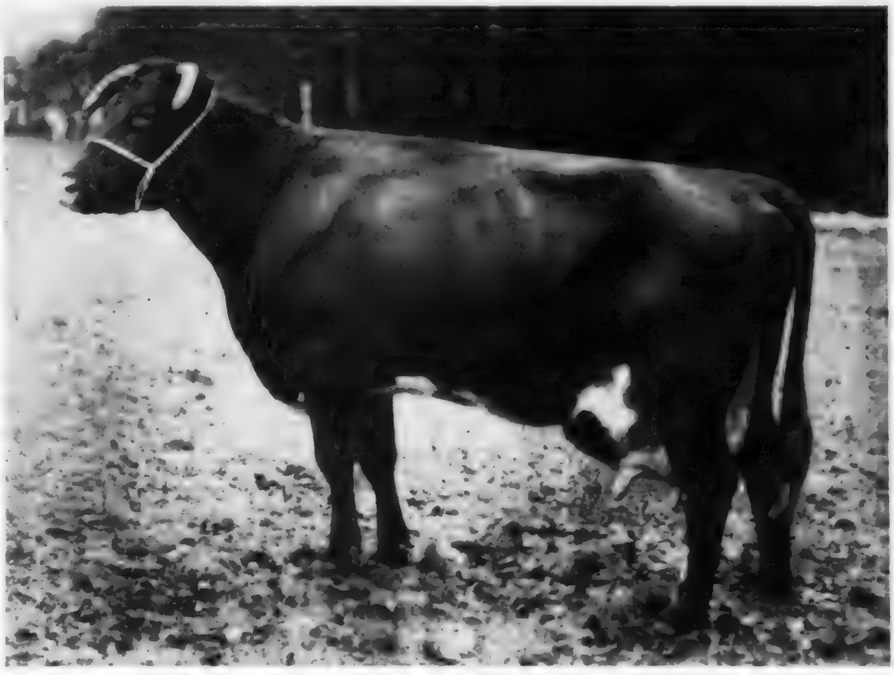
Herds of Milking Shorthorns increased slowly but surely. In 1920 the Milking Shorthorn Society was organized and a check made on the registrations of the cattle of Milking Shorthorn breeding. About fifteen per cent of the cattle recorded by the American Shorthorn Breeders' Association at that time were found to be of Milking Shorthorn type and breeding.

Henry W. Vaughan, in Breeds of Livestock in America, says, "At the beginning any purebred Shorthorn cow of desired type was selected, and if she proved a good milker she was retained. No particular lines of breeding were especially favored at that time, but later certain lines proved to be most potent as milk producers. Thus, though selection was at first based upon type and individual merit, it later was based upon type and individual merit combined with lines of breeding which were most frequently found among the best producers."

Naturally many borderline animals were accepted at the first. It is a contention of critics of the breed that the Milking Shorthorn does not always breed true, perhaps due to this early necessity. The Society, from the very beginning, made no pretention of competing with the dairy breeds, nor with the beef breeds. The sole purpose was, and is today, to refine and develop a true dual purpose cow.

The advance of the breed is a matter of record, and today the Milking Shorthorn is among the major breeds of registered cattle in America.

A hornless type of Milking Shorthorn has been developed also and this branch of the family now represents nearly 10 per



THE LATE FAMOUS WINTON GENTLE 2ND, holder of the world's record of 223,917 lbs. in 15 lactations, twice a day milking. She died recently at the age of 19 years.

THE AVERAGE COW will carry three calves to five months and from there on, with a minimum of grain, calves finish fast as baby beeves, selling near the top.

THE 1946 GRAND CHAMPION Milking Shorthorn dressed 65.8 percent, only slightly below the tops in the beef breeds.

cent of the Milking Shorthorn cattle registered. The hornless feature is popular with the man who runs a number of cattle in sheds and feeds in bunks. Actually more than half the horned cattle undergo dehorning so that those animals dehorned by nature are in good demand.

In the British Isles 60 per cent of all the cattle are Milking Shorthorns and in Ireland, fully 90 per cent. A. N. Duckham, agricultural attache of the British Embassy, Washington says, "The English farmer likes the Milking Shorthorn (or Dairy Shorthorn as the breed is known in England) because the breed does well on grass and hay. We have little grain or supplement to feed in England and we like a breed that produces both beef and milk on rough forage."

Most people think of cattle as either dairy cattle or beef cattle; it is impossible, they believe, to have both meat and milk in one animal. This heresy, according to the Milking Shorthorn breeder, was even taught in our colleges until a short time ago.

The Milking Shorthorn breeder would be the last person to claim that the breed can successfully compete with the Jersey, Holstein or Guernsey in milk and butterfat production, and at the same time give the same performance in the feedlot as the beef Shorthorn, the Angus or the Hereford. They do claim a true dual-purpose place for the Milking Shorthorn, and they point out that unless a farmer is equipped to specialize in either milk production or beef production, his best animal is a Milking Shorthorn. In other words, the average general farm can do better with Milking Shorthorns than with a straight dairy or straight beef breed.

To have the utmost in production from a dairy standpoint, a farmer must have specialized equipment. The same goes for beef production. No Milking Shorthorn breeder has any argument with the specialized breeds, all of which are doing a real job in their sphere. All in their place can show a profit to their owners, which is the final test in all farm operations.

Only a comparatively small proportion of farms are equipped for specialization in the production of milk or beef alone. Not more than twenty-five per cent of the farmers in any section are operating their farms for the special purpose of dairying or beef

A FINE MILKING SHORTHORN BULL, Rockwood Rex Valiant 2nd. At the halter is Fred MacMurray, owner and breeder.

MILKING SHORTHORN CALVES average 75 pounds at birth, but this fine animal, on the Mill Valley Farm, Romeo, Mich., weighed 107 and put on a pound a day for its first month. This calf is Blade Minstrel VIII stock, which has produced 47 qualified daughters.

making. The majority of farmers are operating on a diversified plan of making ends meet by a combination of cattle, hogs, chickens and cash crops. The operations are not confined to producing one commodity. They cannot afford to put all their eggs in one basket, neither could they handle their farms, especially with existing labor conditions, on any specialized plan of production milk and at the same time carry on general farming. Large farms with reasonable land values and the ranges are the places for specializing in beef. Dairying requires expensive equipment and more labor per acre of land, or per cow, if you figure animals as the unit. On the average family farm a dual-purpose animal fits into the general nature of the operation.

The Middle Course

Most statistics on the dairy or beef business fail to tell us where the majority of the milk and meat comes from. The milk production is credited to the dairymen, and the beef to the beef producers. The totals are given, but who actually constitutes the majority of the producers of both commodities, is left to the imagination.

The so-called general farmers, and not the specialists, produce the bulk of both milk and beef consumed in this country. Some of them have dairy bred cattle and some have beef. Some have Milking Shorthorns, but the majority have mixed herds of grade cattle and handle them in various ways, but their farm operations are general in nature. Few, according to the statisticians, have purebred cattle. There is still a big field for better and more efficient cattle on the general farms of the country.

Many are using beef sires in the hope of getting better veal calves only to find themselves losing milk production in the poorer milking heifers from such crosses. They win one way and lose the other. With straight dairy bred cattle there is little beef value in their bull calves and worn out cows. The bull calves will not feed out profitably and the cast off cows make a hole in profits when they are through milking.

The average dairy will lose about one-fifth of its cows a year through culling, sickness and death. For example, four animals in a herd of twenty will be lost, one by death. The other three go as beef. In a Milking Shorthorn herd each cow will weigh up to 400 pounds more than the smaller dairy cow, or approximately a total of 1200 pounds more of beef. The amount this represents at the current market prices is the margin the Milking Shorthorn breeder has over the larger milk checks that the specialized dairyman re-

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FARMERS HAVE FOUND that their best source of timber for farm building is their own woodlot.

Lumber When You Need It

BY A. G. CHAPMAN

FARMERS no longer depend upon their woods for everything from cradles to caskets, as they once did, but they still need them for income, fence posts, building timber, fuel, and for the conservation of soil and water. A farm woodlot can produce locust fence posts in 10 to 15 years. It will furnish a never failing supply of fuel, and lumber for farm buildings and their repair. In time it can produce crops of walnuts, hickory nuts, and maple syrup. It prevents run-off of water that might cause erosion, and becomes a refuge for wildlife. The decaying vegetation in a woods builds up humus and steadily enriches the soil.

In addition to the practical arguments for keeping a good woodlot, man gets a sort of primitive pleasure in having trees about him, a feeling of self-sufficiency which he got from his pioneer ancestors. A strip of woods sets a farm off. It is a barometer of the seasons, heralding spring with its dogwood and redbud, and greeting autumn with its brilliant cloak of gold and red. A woodlot, where nature is allowed to have her way, adds a touch of beauty with its wild flowers, its berries and nuts, and the animals and birds that take refuge there.

In the formerly thickly wooded areas of the middlewest, there are remnants of woodlots on almost every farm. When the

land was cleared, the farmer set aside a patch of trees which he expected to draw on chiefly, for fuel. He may also have had in mind timbers for a new barn sometime in the future. As coal and gas replaced wood as fuel and lumber could be bought conveniently at the county seat, the immediate need for woodlots vanished. Some were cleared and planted. The survivors are often regarded as waste land. They are neither good pasture nor do they return anything in the way of profit. Most of them have been robbed of salable timber and any chance for future profits has been ruined by over-pasturing and neglect.

Where these remains of the farm woodlot occupy land that will raise a crop, the best economy is to clear them out and plant the crop. Where they occupy marginal land that is unprofitable to farm, they can be managed so that there will be a profit from what is generally regarded as waste land. If there is such a piece of waste land available it can be planted to forest trees and in time produce a reasonable profit.

The Right Land For Trees

Generally speaking, land that isn't fit for other crops should be producing timber. Land that is too steep, wet, rocky, or infertile for corn, wheat or pasture makes a good location for the farm woodlot. Usually slopes steeper than 25% are too steep for pasture without danger of erosion and should be forested. Trees are nature's best cover crop and protection against erosion. Trees are seldom a crop for the richest land for this land can earn more in other crops, but land which goes to waste when not in timber should be reforested.

Even if a farmer finds his woodlot on good land, he might find it wise to maintain it there for practical purposes as well as the enjoyment he gets from it. Most farmers can look into the future and foresee a need for timber and fuel, that are selling at increasingly higher prices on the open market. On many level farms the woodlots are at the back of the farm. All of the land was cleared up to them and the strip farthest from the house was left as woods. This makes sense for the most distant fields are the most expensive to farm.

How To Make It Produce

For the most part, farmers aren't ignorant of the worth of their woods. They know that most big trees are worth cash as saw timber and the cull trees and the unmarketable branches have a ready sale as fireplace fuel in the city. They seldom think of a woods as capable of producing a cash crop every year with no damage to the woodlot.

Managing a woods to produce a steady supply of timber isn't hard to do. The labor required will be less than for any other crop. Timber grows while you sleep, and there's no annual chore of planting and cultivating once it is started.

A steady income from trees depends upon whether or not you manage the woods right on a long term basis. Fires, grazing, and over-cutting have already sapped the life out of a big percentage of farm woods, and it will take some planning to get these back in shape. There are half a dozen things a farmer must keep in mind when he looks to his woods for a profit. These principles are:

1. Protect it from over-grazing.
2. Protect it from fire.
3. Prevent over-cutting.
4. Select proper trees for removal each time a cut is made.
5. Adjust cutting time to meet needs and conveniences of the farm and best market prices.
6. Sell on the basis of tree or log value and know what these are before you sell.

The woodlots on most farms today are collections of undernourished saplings over-topped by a few elms and beeches that are scarred by lightning and fire and now fit only for firewood. The soil is packed by grazing animals.

There is no magic formula for bringing this kind of woods back into production overnight, but it can be rehabilitated over a period of time and gradually put back into production. If you own any kind of woodlot, however poor it might be, you have a good start. You have only to take the stock off, cut out some of the dead and damaged trees, and let nature take over the job. Give the young trees a chance to come up in the world by cutting back the stagheads that shade them, for small trees must have sunlight as well as nourishment from the soil. Let the woods go back to the Indians, and within a few years there will be seedlings of oak, hickory, cherry, maple, tulip poplar, or other valuable trees that are common in your locality.

Don't cut out the briars and undergrowth for these protect the soil from drying out and they shelter birds and animals. In undergrowth, seedlings will prosper once the stock is fenced out.

The cull trees that you clear out to open the woods for seedlings shouldn't be wasted. They are valuable as fuel either in your own or somebody else's fireplace. A cord of fuel wood is worth about $16.50. Two men with a buzz-saw can cut 10 to 15 cords of culls and tops a day. A tree with a 22 inch diameter will yield about one-fifth of a standard cord of fuel wood in tops. Odds and ends are usually left in the woods to decay while the owner misses a chance to make an extra profit. There is

FIRE IN A FARM WOODS consumes leaf litter and speeds up erosion. It destroys seedlings and wildlife refuge, scars trunks of large trees and gives insects a foothold.

STAGHEAD WOLF TREES should be cut out. This maple, of value only as stove wood, repressed seedlings over several hundred square yards before it was cut.

a market for nearly any tree your farm produces. Clothes-pin companies buy beech trees; sycamores are turned into butcher's meat blocks; cottonwood and willow feed the pulp mills.

Grazing

Trees and livestock don't mix. Grazing can be, and often is, as destructive to the woods as fire. Most woodlands can carry no more than one cow or its equivalent on 40 acres without damaging the trees. The farmer has to make up his mind whether he wants a pasture or a woodlot. For the greatest profit he can't use the land for both.

Farm animals eat the seedlings and leaves and pack the soil. This increases the water run-off and cuts down the amount of air entering the soil. The trees slow down in growth and the woods begin to deteriorate. Where grazing is heavy, soil washes away from tree roots, and seeds get little chance to germinate.

Woods pasture is ordinarily of poor quality. A government experiment in southern Wisconsin showed that an improved pasture provides 13 times as much grass as a grazed woodlot, and that even an unimproved pasture provides six times as much. The way to have more pasture and more timber at the same time is to improve the pasture and fence the woods. An experiment in Ohio disclosed that woodland pasture is 22% less nutritious than pasture on open land. There is little cover beneath a heavily grazed woods. If your woodlot is potentially good pasture land, and you need pasture more than the woods, clear the timber from it.

The Woods Is On Fire!

When you have to take a day off and fight a woods fire, you have lost more than time. You have lost timber that would have grown into cash. Seedlings were killed and old trees damaged. To avoid this loss there are a few points to keep in mind for the good of your timber land.

There is no good reason for burning brush in a woods. When left to decay it will add to the humus and increase soil fertility. Brush piles are havens for rabbits, birds, and such good friends of the farmer as the black snake. If you must burn the brush, try to choose a calm evening and take every other precaution that you can to keep flames away from the trees. Grass fires often spread to the woodlot. You can easily build a fire lane around your woods by keeping a wagon road there that is free of brush and litter, or by plowing a few furrows around it.

Fires scar the big trees and opens them to attacks by insects and diseases. After the trunk has hollowed out, a tree is of little value except as fuel. Another important loss is from soil erosion caused by the burning of leaf litter that formerly protected the forest floor from puddling and washing. Fire is one of the most powerful enemies of any woods, but a little vigilance will help the farmer keep flames away from his trees. A little care with lighted matches, cigarette stubs, and brush fires can save a lot of timber.

Once you start to manage your woods you will soon see a difference in it. When the young trees begin to prosper you can see the benefits of keeping the cattle out. If there are nothing but large trees there to begin with, the seedlings will, in a few years, make a layer of vegetation beneath them and you will have a two story woods. The best woodlots have trees of all diameters and that is what you're aiming for. You need only harvest the big trees when they are mature and leave the small ones to grow to maturity.

How To Start A New Woods

The trees you are likely to have in your farm woods can be divided into two groups. These are broadleaf hardwoods which drop their leaves in the fall, and needle-bearing softwoods that are mostly evergreen. These may each grow in pure stands or in mixtures. Each requires different handling.

Land that is lying fallow will eventually grow up in trees with no aid from the owner except protection from stock and fire, providing there are seed trees in the vicinity. This is the natural way of development, sure but very slow. It may take half a century to get a good crop of trees by just waiting for them. If fifty years is too long for you to wait, you can lend a helping hand in starting your woodlot by planting.

Such valuable trees as oaks, walnut, tulip poplar, black cherry and sugar maple require good-quality land in which to live and grow. Before worn-out fields will produce such crops, the land must be prepared with the aid of a nurse crop of pine or some other hardy species not requiring such good soils. Thousands of hardwood seedlings may come up in the spring only to die in the hot midsummer sun. Under natural conditions where a field has been slashed, elm or choke cherry or some other low-value species will seed in as volunteers. By the time they are five or ten years old more valuable hardwoods will develop beneath them and gradually become dominant. If you want to realize a cash return from the land within a few years, you can start a nurse crop yourself that will prepare the land as well as grow into usable wood. Locust or pines are good trees for this job.

Where the top soil is completely gone, pines should be planted six to seven feet apart each way. After they have reached fence-post size they can be thinned out and put to work. If hardwoods come in

and shade the pines out, you are better off, for they are generally worth more as timber.

Black locust seedlings will usually grow in these fields, but do better where the soil still has some of its fertility. Locust is a rapid soil builder but is often destroyed by the locust borer. So it is advisable to use 25 to 50 per cent of other hardwoods with it at the time of planting. They should be planted six to seven feet apart. One-year seedlings may be purchased from most state nurseries at prices ranging from $2.00 to $5.00 a thousand. Locust is a fast-growing legume which adds nitrogen to the soil and stimulates growth of nearby trees. Neither locust nor pines need fertilizer. Once planted they reproduce themselves. They must be fenced from livestock, or they may be stunted and deformed, if not killed outright. Another pest of the locust is the leaf miner, which feeds on leaves, causing them to turn brown. This does not kill the trees, but does retard their growth.

After the plantation is about three years old, hardwoods may come in if there are nearby seed trees. If they don't, you can plant the seeds of the ones you want. The small seeds of the ash, maple and cherry can be gathered and sparingly broadcast over the area. Acorns, hickory nuts and walnuts should be planted individually and pressed an inch or two into the soft ground with the heel, and covered. If they are planted deeper, they may not germinate. Young oaks, cherries, and walnut trees growing beneath the cover of locust will grow straight with long, clear stems. And as the locust are thinned other hardwoods have room to mature into valuable timber trees.

A healthy hardwood forest or woodlot is most generally a mixture of several species of trees. Pines usually grow in pure stands or in groups among hardwood species. Pine and locust should not be planted together, for locust grows faster and shades out the pine. Walnut and tulip poplar grow best in plenty of sunlight, but will tolerate some shade in the more fertile soils. Both walnut and tulip poplar will grow well in well-drained bottomland terrace soils and fertile upland soils with good moisture. Oaks, on the other hand, will grow on somewhat poorer soils, as will pine and red cedar. Soft maple will do best on moderately well-drained fertile soils. Sugar maple, like tulip poplar and walnut, requires fertile, well-drained moist soils.

When you plant a woodlot, plant only those trees that will do well in your locality. These may not be the species making up the stand which was cleared away years ago, but they usually are ones that occur naturally around your farm. Before you plant trees that are not natives of your neighborhood, it is best to consult your nearest farm forester or county agricultural agent. Consider, also, the trees which will yield the biggest return.

PURCHASE OF A SAW MILL for less than 200 timbered acres is uneconomical. Portable mills can come into the woods, set up fast and save money on small cuttings.

FACTS ABOUT COMMON TREES

SPECIES	YEARS TO MATURE TO TIMBER SIZE 14"	KIND OF SOIL	PRIMARY USES
Red Oak	40 to 50	Moist well-drained fertile soils. Cove and north and east slopes.	Construction lumber, flooring, furniture ties, mine timbers.
White Oak	50 to 70	Moist well-drained fertile soils.	Construction lumber, flooring, tight cooperage staves, furniture, ties.
Hard Maple	50 to 70	Good deep soil, moist and well-drained.	Furniture, flooring, lumber, wooden ware, novelties, cross ties, boxes, crates, and basket veneer.
Tulip Poplar	45 to 55	Deep fertile soil, well watered. Protected slope and cove soils.	Structional timber, paneling and furniture, boxes, plywood.
Black Walnut	40 to 60	Deep, moist, fertile well-drained soils. Protected slopes and coves.	Furniture, paneling, gun stocks, wooden ware, and novelties.
Beech	60 to 80	Moist to moderately wet soils, good to poorly drained.	Lumber, furniture, flooring, handles, wooden ware and novelties, basket veneer.
Sycamore	40 to 50	Moist fertile bottomland soils.	Lumber, veneer, paneling, furniture, cross ties, and cooperage.
White Ash	50 to 60	Moist, fertile moderately drained soils.	Handles, lumber, furniture, truck beds, wooden ware, novelties.
American Elm	20 to 40	Moist, poorly to well-drained soils with average fertility.	Boxes, crates, excelsior, basket veneer.
Red Elm	25 to 45	Moist, fertile well-drained soils.	Furniture, wooden ware, lumber, mine timbers, posts.
Rock Elm	25 to 45	Moist, fertile, deep, well-drained soils.	Ship timbers, lumber, truck beds, mine timbers.
Soft Maple	30 to 40	Moist poor to well-drained soils.	Lumber, pulpwood, boxes, crates, excelsior, basket veneer.
Black Cherry	40 to 50	Deep, moist, fertile soils, well-drained. Protected slopes and coves.	Lumber for furniture, veneer, inside finishing, wooden ware, and novelties.
Cottonwood	15 to 30	Fertile, moist sandy bottomland loamy soils.	Lumber, veneer, pulpwood, excelsior, boxes and crates.
Willow	20 to 30	Alluvial very moist soils along stream courses.	Slack cooperage, veneer, excelsior, paper pulp, artificial limbs.
Black Locust	35 to 45	Deep, moist, fertile, well-drained soils.	Fence posts, mine timbers, poles, insulator pins, cross-arms.

Harvest The Timber

Mistakes in farm forestry seldom come in bigger numbers than they do at harvest time. Harvesting a crop of saw logs requires care and a bit of know-how. The manner in which you harvest your woods will help determine how much you will make on it and how long it will produce. You can take off the logs under 12 inches in diameter that are still putting on growth and lose money; or you can allow them to grow into big timbers. You can take the decayed or cull trees out or they can stay to take up good space in the woods. You can, in fact, make the logging the profit or loss of your woodlot.

Timber harvest fortunately knows no season. It can be done any time of the year. Late fall and winter are better because temperatures are more pleasant for the heavy work, and in these seasons the hardwoods have dropped their leaves and felling does much less damage to smaller trees. Seeds have also fallen and logging will help stir them into the soil.

Foremost among the questions that a farmer usually wants answered about his woods harvest is, "How much should I take out and how much should I leave?" Foresters learn the answer to this by figuring how much wood the forest is growing every year. This amount can be safely harvested. If you take out more than the woods is capable of producing you are not only spending the interest but dipping into the capital. By building up your woods with healthy, young trees you are increasing the amount that can be taken in future loggings.

A first-class woods of mixed hardwood trees of sound quality and good species should produce 300 board feet per acre annually. Where a five-year cutting cycle is followed there will be 1500 board feet to be taken at each harvest. The owner of this woods can expect to get $20.00 to $40.00 a thousand for this timber on the stump, or a total for the five years of $30.00 to $60.00 for the acre. This is a yearly income of $6.00 to $12.00 per acre, not including the extra cash that can be brought in by cutting and selling tops and cull trees for fuel.

Ordinarily, it doesn't pay to take the year's growth out every winter. Logging is an expensive operation and the more logs harvested at one time the less the cost per log. The farm woods should be producing a good harvest about once every five to ten years. Then take out what the woods will produce by the next harvest, so that by that time it will be right back in its original condition as a first-class woods.

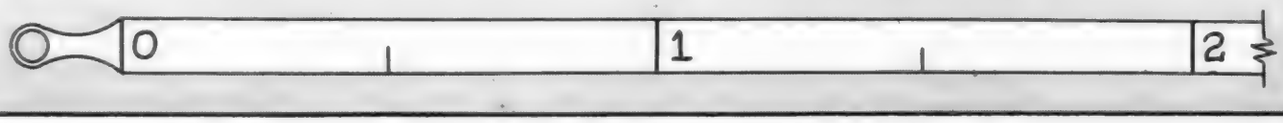
When it is time to decide which trees should be logged out, you have to think of several things. First, you want to take out those trees that have reached their best size for harvest. When a tree reaches maturity it slows down in growth and after that there is danger that it will become weakend by insects, wind, or decay, and you'll lose it. You will want to take out those trees that will never become good saw logs because of fire scars, disease, or poor shape. These can be turned into fuel wood, fence posts, or perhaps rough timber for farm buildings. It is good policy to leave an occasional large hollow tree where coon and squirrels can live. If you have time you should cut the weed trees, such as ironwood and black gum, that are taking up space in your forest, but not returning value for it.

By selling trees on the basis of their individual merits a farmer can get the extra cash that his more valuable trees are capable of earning. Large tulip poplar, black walnut, and black cherry trees often bring prices that pay the owner for cutting and selling them individually. When you sell for a lump sum you let your good timber go

How To Figure The Volume of a Tree

Tree diameter (inches)	NUMBER OF BOARD FEET BY NUMBER OF USABLE 16–FOOT LOGS								
	1 (log)	1½	2	2½	3	3½	4	4½	5
10	36	48	59	66	73				
11	46	61	76	86	96				
12	56	74	92	106	120	128	137		
13	67	90	112	130	147	158	168		
14	78	105	132	153	174	187	200		
15	92	124	156	182	208	225	242		
16	106	143	180	210	241	263	285		
17	121	164	206	242	278	304	330		
18	136	184	233	274	314	344	374		
19	154	209	264	311	358	392	427		
20	171	234	296	348	401	440	480	511	542
21	191	262	332	391	450	496	542	579	616
22	211	290	368	434	500	552	603	647	691
23	231	318	404	478	552	608	663	714	766
24	251	346	441	523	605	664	723	782	840
25	275	380	484	574	665	732	800	865	930
26	299	414	528	626	725	801	877	949	1,021
27	323	448	572	680	788	870	952	1,032	1,111
28	347	482	616	733	850	938	1,027	1,114	1,201
29	375	521	667	794	920	1,016	1,112	1,210	1,308
30	403	560	718	854	991	1,094	1,198	1,306	1,415
31	432	602	772	921	1,070	1,184	1,299	1,412	1,526
32	462	644	826	988	1,149	1,274	1,400	1,518	1,637
33	492	686	880	1,053	1,226	1,360	1,495	1,622	1,750
34	521	728	934	1,119	1,304	1,447	1,590	1,727	1,864
35	555	776	998	1,196	1,394	1,548	1,702	1,851	2,000

To figure the board feet in a tree you'll need a diameter tape. Mark on a steel or good quality cloth tape units from 1 to 35 in the exact lengths of those in the drawing below. Wrap it around the tree, 4½ feet from the ground. The reading on the tape will be the tree's diameter in inches. Estimate or measure the number of usable 16 foot logs in the tree trunk from the ground to the first large branches. The logs have lower values if they contain lightning scars, decayed spots or other large defects. To get the volume, plot the diameter against the number of logs in the table at the left.



THE FENCE erected by this farmer is the first step toward bringing his woods back into production. Grazing a woods encourages erosion, packs soil so that it will not hold moisture, and kills seedlings which are the timber of the future. Woods pasture, even the best, provides only 1/13 as much grass as a good improved pasture.

at the prices paid for the cheaper trees.

When you decide that you want to shift your woodlot to the profit column, it is a good idea to call in a trained farm forester; most states provide this service free. A forester can help mark the trees to go in the first cut. He can readily identify the slow growing mature trees, those that are defective or poorly formed, over-topped trees, and weed trees. He will know if there is sufficient salable timber to justify cutting.

A forester can also give the farmer an accurate forecast of the future value of his woods. He can tell approximately how much salable timber the woods will grow in the next five or ten years. From this you can tell whether it will pay to make cuts every five years, or whether you should wait longer for bigger harvests.

A farm forester can be contacted through the state forester at the state agricultural experiment station. He will visit your farm and help you draw up a long term plan to put your woods into production and keep it there. He usually knows the answers to all your woodlot problems.

After every logging there will still be plenty of timber in the woods that could have been sold, and that's the way it should be, for if it is all taken out at once, you will wait 40 or 50 years instead of another five for the next harvest. It is these all-over cuts and the 50 years of waiting that has helped make woods farming unattractive. It need not be that way. Good hog feeders don't sell all of their breeding stock along with the fat hogs at market time. It has to be the same with a profitable woods if it is to be profitable over a long period of time.

How To Sell It

There are four ways to sell your timber. One is to sell it as a lump sum after you have completed an estimate of the volume of each kind of tree in the woods. Another is to cut the trees yourself, scale them for volume, and sell them to the mills. A third is to mark the salable standing trees but allow the buyer to cut them, and then compute the volume for which he should pay. You can also cut your trees and haul them to the mill on your own equipment. Eugene Morrison of Ross County, Ohio, did this with a crop of softwood trees harvested from his river bottom land and got $19.00 a thousand board feet instead of the $10.00 he was offered for the timber on the stump. This way you sell your timber plus your labor during a slack season. Portable sawmills are being used in increasing numbers for small jobs, because they can be taken to the woods and set up fast. It's usually harder to get a good job on a portable mill. Where you are selling high grade timber, such as veneer trees, it is best to consult the buyer first to see how he wants it cut for his purpose.

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A CENTURY

THERE is no Golden Age in farming. It is only in the minds of men that the past takes on the aura of peace and plenty, of satisfying labor and abundant harvests, the simple and complete life. When Currier and Ives were selling their prints into American homes, during the last half of the last century, a new era was dawning. The Civil War changed the pattern of life in the South; machinery was invading all fields of human endeavor; railroads were being built across the country, linking the isolated West with the Atlantic seaboard: agricultural techniques were changing over-night. Men looked with nostalgia on the good old days when farming was simple and undisturbed by the rush of new inventions and the increasing tempo of life everywhere. They longed for the old days and the old ways just as today we rush into the Atomic Age, but feel homesick for the simplicity of the horse and buggy life of our grandfathers.

The farmer of 1820 had problems, no less bothersome then than our problems are today. They were just different problems and no easier to solve. The plodding oxen dragging their crude plow a scant acre and a half a day, the dawn-to-darkness labor in the fields, the isolation, the candle light and the lack of plumbing: grain was planted by hand and harvested with a scythe, or perhaps a cradle-scythe, threshed out by flail or the trampling feet of animals. Labor was cheap but it took four men and six oxen a full day to thresh fifty bushels of wheat. Marketing was an uncertain business in a land where paper money was often discounted thirty or forty per cent if it was considered to have any value at all, and where the markets were so far away that the farmer could not transport his own crop if he hoped to get his planting done for the next season. Transportation costs were so great as to be prohibitive for farmers whose land lay fifty miles from the river or the market.

They lacked scientific knowledge of agriculture and their methods were ridden with superstition. When soil fertility was depleted and they lacked sufficient animal manure they turned to "earth burning" which was brought to England by the Romans before the birth of Christ. Grass sod was cut and dried in the sun and then burned to produce ashes for fertilizer. This practice had been forbidden in England where it was found that the removal of the top soil and sod soon ruined the fields, but here in America where land was plentiful the sod from one plot was stripped and burned to keep up the fertility of a growing field.

New land had to be cleared with an axe and sweat; tree stumps dotted the growing fields and interfered with cultivation for years before decay disintegrated them. Farm tools were crude products of the farmer's own labor. The harrow, for example, was made of rough hewn lumber with wooden pegs driven in for teeth.

We have solved the problems that beset our ancestors, but we have new ones, no less troublesome. Erosion caused them little concern for the vast forested areas and the earth, rich with the humus of forest decay, held the moisture and kept it on the field.

The plague of insects, except for the bothersome house fly and the periodic cricket, had not yet become the menace

OF PROGRESS

they are today in their battle for the crops, and foreign pests were still beyond the oceans. The soil was thick and deep. Against the uncertainties of life was the reassuring knowledge that there were seemingly unlimited lands where a man might go with some assurance that he would be self sustaining.

Now we have machinery which not only cuts down the amount of labor we must do, but permits us to accomplish in a day what would have taken a week or two to do in the old days. We have automobiles and good roads to take us into the city between supper and the first movie—a journey so arduous in 1820 that the farm produce could not profitably be transported. Radio brings us the news of the world and entertainment. The combination of telephone, postal system, radio, and automobile today make solitude almost a luxury. Our wives cook with electricity or gas, wash their clothes by machine, and do their "canning" in a 30 cubic foot home freezer.

But we have a depleted soil and we must fight to keep wind and rain from stealing the best of it away. We are engaged in an ever-lasting battle with insects and rusts and blights and things that crawl and creep. Our families are tempted by hucksters a thousand miles away, convincing them of needs they never realized they had. We feed the starving soil with fertilizers and nostroms and we worry about rotations and pH and hybrids, and too many or too few markets, and food for the hungry in Europe and Asia.

Each age, it would seem, has its evils, which are sufficient unto the age itself. The grass was not greener in 1820 than it is today. There is no Golden Age, no easy way to happiness on the farm except in our memories and desires.

Currier and Ives capitalized on this common human frailty. Their prints sold in American homes because man seeks an escape from the cares of his day. They express so well, in their unsophisticated way, what we wish could be.

The Currier and Ives partnership, which had dominated the field of lithographic reproduction for a half a century, was sold in 1907. The Bavarian slate stones which had been used to produce the countless thousands of prints were sold by the pound and all of the unsold pictures were bundled up and disposed of as remainders. Since that time the world has rediscovered the work of this famous old firm and the original prints are now collectors' items, commanding prices which would have seemed utterly fantastic to Nathaniel Currier the lithographer, or his business partner, James Ives.

An assembly line of colorists took the lithographed drawings and added all of the color by hand. Morality was a favorite theme, illustrated by such prints as the "Drunkards' Progress." Vitriolic political cartoons, race horse pictures, hunting prints, and comic drawings, were turned out by the hundreds.

There are, undoubtedly, still many of their original prints, priceless to collectors, hanging on farmhouse walls, or mouldering away in attics. One such print, "Life Of A Hunter—A Tight Fix," which originally sold for a few cents, recently brought a record price of $3,000.

THIS BULL is in the early stages of lump jaw. Since the market price of the animal will be affected very little at this point he will be sold promptly. Lesions around the head of the animal are the usual point of entry for the germs.

LUMP JAW

BY B. J. KILLHAM

ONE of the reasons why milk producers are asking a higher price for their product is that dairying is one blankety-blank thing after another. There seems to be a germ lying in wait in every corner of the stable and behind every tree in the pasture, taking pot shots at unwary cows. It takes a lot of milk to make up the loss of a $350 cow. Every herd owner must write off such a loss now and then and you can scarcely blame him for demanding a better milk price as protection against the inevitable.

A particularly bad actor among germs that infest the cow stable causes lump jaw. Probably because they are more expressive, "lumpy jaw," "big jaw" and "wooden tongue" are common names for the disease. If your favorite cow appears some morning looking like an old fashioned advertisement for tooth ache remedy the thing to do is to make a smart right-about-face and call a good veterinarian. She may have been injured or she may actually have the tooth ache, but it's not wise to take chances. This lump jaw bug is an energetic fellow and if he finds a lesion around the head of an animal he is likely to move in and set up housekeeping at once.

The fact is, lump jaw can be caused by two germs, very much alike. One is a sort of fungus and the other is a bacterium. Just for the record we'll give them their party names. The fungus is called actinomyces and the bacterium is called actinobacillus. The former attacks hard tissues such as bone and the latter muscular tissues. For most purposes they may be considered together for the two are almost always found working in partnership and both respond to the same treatment.

Prevention

Swellings about the head, particularly in the region of the lower jaw, should always be regarded with suspicion. Lump jaw is one of those diseases which cannot be prevented, but it certainly can be eliminated from the infected animal if discovered early enough. If the disease is allowed to develop for several months and there is much tissue destroyed, particularly in the tongue or bone, a cure is doubtful

and the animal probably should be sent to the butcher before spread of the disease and complications render the carcass unfit for food.

Is It Contagious?

This disease is not contagious in the ordinary sense of the word. Unless the affected animal has a lesion that is open and discharging, there appears to be no reason why it should be considered a spreader of the disease. The danger of acquiring the disease from the infected animal is sometimes over-stressed. It was thought at one time that the germs were carried into the mouths of cattle on the feed, and finding lodgings in the cavities of the mouth and throat, they started raising families. Investigators, however, have found the organisms in the mouths of apparently normal cattle. These discoveries coupled with claims that the organisms are delicate and do not thrive under outside conditions support the belief that the injuries in the region of the mouth are more important than the source of the bacteria or other organisms. In other words, the germs may be present but are harmless unless there is a break in the tissues. The eating of rough feed or sharp food particles like barley awns could readily produce injuries that would serve as open doors or gates for the convenience of the germs.

The tissue breaks that accompany teeth changes in young cattle frequently offer a fine opportunity for the lump jaw germ to establish himself. Reports from the Southwest indicate that the disease is not uncommon among cattle eating the fruit or other parts of the cactus plant.

Organisms similar to those causing lump jaw in cattle have been found in the mouths of human beings, leading to the belief that man may acquire the disease in the same manner as do cattle.

Lesions resembling those made by the fungi organisms found in the udders of sows were formerly believed to be due to casual injuries and contact with vegetation harboring the fungi. Now, however, it seems more logical to assume that the teeth of the suckling pigs and the organisms in their mouths are the culprits.

Bacteria of various kinds are found in lump jaw infections but they are probably secondary invaders which came in as camp followers of lump jaw germs. Once inside the lesion they find the environment ideal for their particular type of life.

Lesions

The lesions of actinomycosis, as we have mentioned, are chiefly confined to the bone and they generally appear as swellings or tumors involving the bones of the jaw. The lower jaw is the more frequent seat of the trouble, but the invasion of the upper jaw with the possible extension into the nasal cavity and sinuses does occur. Obviously, if the disease is allowed to progress, the affected animal will reach a state wherein it is unable to eat and body decline and starvation may ensue.

Actinobacillosis is responsible for swellings and tumor formations in many of the soft structures of the head and upper neck. If the tongue is invaded, the term "wooden tongue" is applied. This term is used because the infected tongue becomes rigid and immobile, resembling a piece of wood.

Lump jaw often proceeds beyond mere swellings and tumors. If neglected, open lesions, discharging pus, granules, and other debris in large amounts, may result.

Structures in other parts of the body occasionally may be affected, particularly by the actinobacillus. Lesions are sometimes found in the chest cavity and occasionally in the digestive tract, but in the vast majority of cases lump jaw is localized in the head region.

Treatment

Early diagnosis, followed by immediate surgical treatment almost always leads to complete recovery. This is particularly true when the affected area is superficial and confined to the lower jaw. Once the bone structures become involved the situation is serious. Then, even careful treatment may not effect a cure. Treatment is the task of a veterinarian, but the animal owner must obviously be on the alert to detect the first appearance of swelling or enlargement. Every animal in a herd should have periodic examinations, and the examiner must know what to look for. Every abnormal growth or condition should be suspected.

The complete surgical removal of the affected part or parts, if that safely can be accomplished, offers the best possibility of a cure. When the infection is too extensive for surgery veterinarians frequently effect a cure through the careful application of caustic agents by means of incisions or punctures. The action of such an agent will often cause the diseased tissues to slough, or produce a condition favorable for surgical removal.

Potassium iodide, administered by the way of the mouth, has been used with

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WHEN POTASSIUM IODIDE is used as a specific for lump jaw, treatment should cease when symptoms of iodine poisoning appear else the animal will die from the cure instead of the disease. This cow had too much. She eventually died.

He's droopy . . . he doesn't eat well . . . he hates to get out of bed in the morning. His future is bleak and discouraging.

What Ails My Pigs?

BY JACK BAILEY, D.V.M.

A DISCOURAGED Illinois farmer boxed up three dead pigs and sent them to the laboratory at his state agriculture school. Nailed to the side of the crate was this letter:

"Gentlemen:

I am sending you inclosed three pigs. These animals were all right in the evening. They ate their feed and acted normal. The next morning I found them stiff and cold. Can you tell me what is the matter with them?"

The laboratory workers gave the pigs a thorough post mortem and the owner eventually received the following reply:

"Dear Sir:

After careful study of the submitted animals, we are reasonably sure that the pigs are dead."

The farmer didn't see the humor, for he had been the victim, too often, of pig fatalities, "cause of death unknown." Pigs die and death often is all that anyone is sure of. There are so many things that can cause a pig to stop breathing; how is one to know which one did the dirty work?

Pigs are subject to more diseases than any other animal except man. Such being the case, to make a logical beginning on a murder mystery, we ought to start by making a list of suspects. In this case, it would be a list of the diseases that kill pigs. Of course, the chances are that two or three of them teamed up to do the job, and we won't be able to say which one did the actual killing. Anyway, we'll have the possibilities.

To help out the detective work, we ought to divide the pigs into groups according to age. A couple of them should be enough. For want of fancy names, we can call them Big Pigs and Little Pigs. Let's say that the Little Pigs are those that have not been weaned. The Big Pigs would be all of the others, up to the time they are ready to go to market or die of old age. Let's begin with the Little Pigs, and see what can kill them. There are quite a few possibilities.

The commoner diseases are hairlessness, anemia, scours, enteritis, pneumonia, bullnose, sore mouth, ascariasis, mange, lousiness, and swine pox. Now let's get closer to these diseases, and look at them in regard to cause, symptoms, and diagnosis.

The matter of cause deserves special attention. We may know that a disease is caused by a certain germ or virus, but we also know that there are causes for the disease getting a foothold. Many diseases would not strike at all unless they found conditions agreeable for their conquest. Things diseases like best are filthy quarters, infected grounds, overcrowding, deficient diets, exposure to bad weather, and so on. They are all important steppingstones for disease, even though they may not be the killers.

We can also generalize about symptoms. Every sick pig has the symptoms of a sick pig. He doesn't eat, and he's apt to have a fever. He's droopy, and he hates to get out of bed. He gets thin, and he gets weak. He looks like the morning after the night before. Now, there's no excuse of repeating that rigamarole for every disease we consider. Suppose we call those things general symptoms? We can point out any extra troubles of Little Pigs.

Little Pig Troubles

Hairlessness in baby pigs means that the youngsters are born naked instead of covered with silky hair. The cause is a lack of iodine in the diet of the mother before birth of the pigs. The symptoms are plain enough, for in addition to being naked, the babies are weak, and may even be born dead. The same effects may be seen when abortion occurs for some reason or other, but enlargement of the thyroids along with the nakedness is enough for a diagnosis of iodine deficiency.

Anemia is something that we don't know too much about, but it certainly is a common disorder in little pigs. The cause is usually a deficiency of iron, or trace elements like copper and cobalt. There is a possibility that iodine deficiency may also have something to do with the trouble at times. Of course, sucking parasites like lice and worms can cause another form of anemia by actually draining off the blood.

The symptoms are pretty general, for the pigs are droopy, fail to grow, lose weight, and may even become paralyzed. A close look shows that the lining of the nose and mouth is too pale, as is the inside of the eyelids. They breathe rapidly and develop pot bellies. Diagnosis is usually not too difficult. However, anemia is apt to be only part of the picture, as it is usually associated with other diseases. The condition is often seen in pigs that are raised on concrete, and kept from getting minerals from the soil. It is also common in animals that are raised in cold and filthy quarters.

Scours is another disease that we don't know much about. There are probably other causes, but a bacterium with the fancy name of *Escherichia coli* is most frequently blamed. The trouble is that this fellow is found in the digestive tracts of all pigs, even in healthy animals. Such being the case, it is reasonable to assume that something happens to make the bacteria suddenly dangerous. Once started in a herd, the bugs tear down all the fences and run wild. Like anemia, scours is commonly found in pigs that are raised in wet, cold, and dirty surroundings, though it may be found where conditions are ideal. Likewise, it may be found in company with other

diseases. Whether the other diseases pave the way for scours, or whether the scours make it easy for the other diseases to start, the experts aren't prepared to say. Just about everything has been blamed for aiding scours to get its foot in the door . . . everything from poor diet and management down to an unknown virus. The symptoms are specific, for whenever a suckling pig over four days old shows signs of a watery, stinking diarrhea, it is safe to call the disease scours.

Enteritis is an inflammation of the intestines that is often confused with scours. This is excusable, for the two diseases resemble each other a great deal. However, the cause of enteritis is definitely unknown, though it is boosted along in its dirty work by the same contributing factors as scours. Symptoms are pretty much the same as for scours, except that diarrhea often does not appear. Diagnosis depends on the age of the affected pigs, and the duration of the disease. Enteritis attacks the babies within the first four days of life, while scours starts later. Enteritis may even attack the pigs before they are born, and cause them to be born dead. The disease acts fast and few of the stricken pigs live beyond the third day, while a pig with scours may drag along for weeks before dying or recovering.

Pneumonia is another disease with an unknown cause. All kinds of bacteria may be found in a pneumonia case but it's pretty hard to figure which one is guilty, which one is cause, which is effect. For that matter, they may all be innocent of actually causing the pneumonia, because outside of being on the premises, we have no proof of their guilt. All in all, it's puzzling, and easy to understand why this killer of Little Pigs remains a mystery. We do know that such things as exposure to cold, soaking with rain, and damp, drafty quarters are big helps to pneumonia. We also know that weakness brought on by other diseases encourages it. The most noticeable symptom is hard, rapid breathing, often with the mouth open, and drooling froth. Noises are usually heard in the lungs. Affected animals are mighty sick pigs, and diagnosis is apt to be a bit difficult. When the disease is pneumonia alone, it rarely hits more than a few pigs in a herd. The problem is to find out if pneumonia is the only disease involved. Even if it is pneumonia alone, it probably won't be alone for long, because other troubles are apt to move in on the poor stricken pig.

Bullnose and sore mouth, or necro, as both diseases are commonly called, are easy to diagnose, and for a change we know the cause of the trouble. The bad boy is a bacterium by the name of *Actinomyces necrophorus*. Even though both diseases are evidently caused by the same organism, it attacks different parts so that we will consider them as separate diseases.

Bullnose starts out like a bad cold, with running at the nose and sneezing. There is much head shaking. Raw spots like cold sores appear on the ends of the snouts. It isn't long before swollen, crooked noses show what the real trouble is. Examination shows parts of the nose bones eaten away, with abscesses and rotting of the flesh. This disease appears in the pigs at about weaning time, because it takes a few weeks for the disease to work up into a bad stage. Diagnosis is easy.

Sore mouth is just exactly that. The front teeth and the gums are usually attacked first. They become loosened, and blackened, and certainly sore. Along with these symptoms, yellow pus pockets and abscesses show up on the gums at the bases of the teeth. Eventually the teeth may drop out, and the bones of the face rot away as the nose bones do in bullnose. Like the other form of necro, sore mouth is apt to appear about weaning time, and it is certainly not hard to diagnose.

Next on our list is ascariasis, a disease caused by ascarids, or roundworms. Along with general symptoms, the pigs often get the "thumps", an affliction much like hiccups. They cough, sometimes vomit, and breathe with difficulty, the severity of symptoms depending on how many worms the pig is carrying around. Positive diagnosis may be made by finding the worms in the intestines or larvae in the lungs of a dead animal. Finding the microscopic eggs in the feces of a living animal is also certain proof of infection. Even so, the story may be only half told, for other troubles are apt to be mixed up with the worm infection.

Mange is a skin disease that is found almost entirely in the fall and winter. Here, too, we are sure of the cause, tiny sarcoptic mites. The disease is usually not found in the spring and summer, because the mites cannot stand sunlight. Even if the pigs get out-of-doors in the fall and winter, there is not likely to be enough sunshine to kill the mites. The symptoms are intense itching, bald spots, thickened

HOGS may be vaccinated for cholera at any age but the most economical time is when they are weaned. Most veterinarians recommend the "double treatment" which consists of serum and virus injections in two parts of the hog's body. This will develop an immunity which usually protects the hog for the rest of its life.

CONTRAST the happy hog family above with the gang of "dead end kids" in the small barn lot below. The entire housing development in the pasture field can be hauled away to another field in less than an hour with a tractor or team. The hogs kept in filth are headed for no good end; see the chart opposite, with 20 possibilities.

wrinkling of the skin, and general unthriftiness. The pigs pick up the mites from their dams while nursing, so the mange usually starts around the eyes and noses. The pests spread rapidly, and it isn't long before they are all over the bodies of the pigs. Diagnosis is made by taking a skin scraping, and finding the mites under a microscope.

Lousiness is another skin disease with a definitely known cause. The hog louse is a sucking louse, and a carrier of the swine pox virus as well. It is the grand-daddy of all lice in the matter of size, for it is sometimes a quarter of an inch long.

The symptoms are about the same as for mange, and the two parasites may live together on the same pig. Anemia can result because the lice suck blood, and will drain the pig. Lousiness has a tendency to decrease with warm weather and sunshine, but it never disappears like mange. Diagnosis is made by finding the lice, or the nits on the bristles. A careful inspection of the pigs is all that is necessary, for these fellows certainly aren't hard to see.

Swine pox is a skin disease that may be so mild as to escape notice, or it may be bad enough to kill off half the pigs. The cause is a virus, and we have already noted that it is carried by the hog louse. The symptoms are general, and variable according to the severity of the disease. Diagnosis is made by finding the typical small pustules on the skin, which break and then scab over like those of cowpox. In really bad cases, the eruptions may be found all over the body. A pig usually gets over the disease in ten to fourteen days, and this fact may help in making a diagnosis. It spreads quite rapidly, and may go through a whole herd in six to eight weeks.

There are other rarer diseases that can cause trouble in suckling pigs, but these are the commoner ones.

Now, The Big Pigs

It isn't exactly hewing to exact truth to say that Big Pig diseases are confined to Big Pigs only, for some of them may also attack the Little Pigs. However, we have to draw the line somewhere, and since some disease headaches are generally found in weaned pigs, they'll be considered as diseases of that group. Likewise, Big Pigs may suffer many of the same diseases that we have credited to the Little Pigs. As a matter of fact, there are only four of those just considered that the weaned pigs cannot also have. Those four are hairlessness, anemia, scours, and enteritis. The Big Pigs have scours and enteritis, too, but these troubles are of a different nature in the older animals. However, we have a whole list of new diseases lined up for the Big Pigs. Let's have a look at them.

They are lungworm disease, rickets, cholera, septicemia, gastro-enteritis, necrotic enteritis, bloody dysentery, erysipelas, and influenza.

As the name indicates, lungworm disease is caused by lungworms. These fellows are a double-barrel threat, because in addition to the damage they do as worms, the larval stage carries the virus of swine influenza. The innocent earthworm is mixed up in this deal, too, and the story is rather interesting.

The lungworms lay eggs in the lungs of the pigs, which are coughed up into the mouth and swallowed. They are then carried out with the feces to the ground. The earthworms gobble them up and the eggs hatch into larvae inside the worms. The larvae don't seem to do any damage to the earthworms, which seem able to carry them around indefinitely. At any rate, they can live through the winter. When a pig eats one of the infected earthworms the next spring, the larvae burrow through the walls of his intestines, and get into the blood stream. The blood eventually carries the larvae to the lungs, and here they grow up into worms that again start laying eggs and the vicious cycle is complete. If the larvae have picked up the virus of influ-

enza somewhere along the line, so much the worse for the pig.

Because of the way that the earthworms figure in the story, only pigs that have access to unfrozen ground can become infected with lungworms. Along with the general symptoms of sickness goes a peculiar rapid, hacking cough. Infection may be heavy enough to kill the pigs. Diagnosis is made by finding worm eggs in the feces, or by finding the adult worms in the lungs of a dead pig. Maybe some other disease killed the animal, but you can bet your store teeth that the lungworms didn't help him any.

Rickets is a disease of the bones, and the cause is well known. Rickets is caused by a deficiency of calcium, phosphorus, or vitamin D in the diet. It is not too common in milk-fed pigs, for milk usually contains plenty of calcium and phosphorus. However, vitamin D may or may not be present in large enough quantities. The vitamin angle is taken care of if the pigs have a chance to get green feeds or sunlight, but animals that are shut up indoors may suffer. Symptoms are lameness and stiffness, large joints and bowed legs. In bad cases, the pigs may be wholly or partly paralyzed, able only to crawl around on their knees. Diagnosis is not difficult when history and appearance are considered, but as usual, other diseases may barge in on the weak pigs and make a bad situation worse.

Now we come to cholera, the worst scourge of the swine world. We know the cause is a virus, all right, but there is woefully little to say about symptoms. Not that there aren't plenty of them, but they are just about the same for a great many other swine diseases. The lack of specific symptoms means that in the beginning, every outbreak of any swine disease must be considered as possible cholera. Let's have a look at some of those symptoms, vague as they are.

The pigs hide away in their nests, they don't eat, they get a diarrhea, they develop a fever, they show red spots on their bodies, their eyes water, they tire easily, they become paralyzed, they die. All, or only part of these symptoms may appear. An owner can see that his pigs are sick, and that's about all he can see. Many a pig has died of cholera, and had his death blamed on something else. There isn't any certain way of diagnosing cholera in the field. However, the disease has a few little peculiarities that may help in making a guess. As a rule, there are no sudden deaths, but the pigs hang on for a week or ten days before finally turning up their toes. The word "death" should be underlined, for there are very few recoveries from cholera. Another thing that may help is the history of how the pigs sickened. With cholera, there is usually only one or two pigs that sicken first. About the time they die, many of the other pigs are beginning to sicken, and finally they're all

(Continued on page 114)

THIS LITTLE PIG has an excellent chance of growing up and becoming a mother. She lives in a clean, modern pig house. And most important of all, her master has an understanding eye, sometimes known as a "knack with animals."

THE DISEASES OF SWINE

DISEASE	CAUSE	USUAL APPEARANCE	SYMPTOMS
Hairlessness	Iodine deficiency in diet of sow.	Birth	Hairlessness, weakness, still-births.
Enteritis	Unknown	1—3 days	Death within first three days of life.
Scours	Escherichia coli (??	4 days—4 wks.	Diarrhea, weakness.
Swine pox	Virus	1 wk. on	Pustules on skin.
Anemia	Iron, copper, and cobalt deficiencies.	1—6 wks.	Droopiness, pallor, "thumps," pot belly.
Pneumonia	Unknown	2 wks. on	Fast and difficult breathing; rales in lungs.
Bullnose	Actinomyces necrophorus	2 wks. on	Swelling of nose; rotting bones.
Soremouth	Actinomyces necrophorus	2 wks. on	Loosening of teeth; necrosis of gums and tongue.
Ascariasis	Ascaris lumbricoides	2 wks. on	"Thumps," coughing, vomiting.
Lungworm disease	Metastrongylus elongatus & M. brevovaginatus	6 wks. on	Coughing, stunted growth.
Cholera	Virus	6 wks. on	General symptoms; death in 7—10 days.
Septicemia	Salmonella cholerasuis (?)	6 wks. on	Same as cholera, but with sudden deaths.
Gastroenteritis	As above	6 wks. on	Same, with more diarrhea and fewer deaths.
Necrotic enteritis	As above	6 wks. on	Same as for cholera, but chronic form with few deaths.
Bloody dysentery	Unknown	6 wks. on	Bloody diarrhea, variable death rate.
Rickets	Calcium, phosphorus or vitamin D deficiency	8 wks. on	Large joints, lameness, bowed legs.
Erysipelas	Erysipelothrix rhusiopathiae	10 wks. on	Like cholera, more stiffness, variable death rate.
Mange	Sarcoptes scabei suis	Any age	Itching, bald spots, wrinkled skins.
Influenza	Virus plus Hemophilus suis	Any age	Soreness, coughing, sudden onset and recovery.
Lousiness	Haematopinus suis	Any age	Same as mange.

The Pioneer Clears His Land

A HOMESTEAD FARM in Matanuska Valley, Alaska, costs $1.25 an acre. With the aid of a bulldozer, a wife and two hard working youngsters, this pioneer farmer clears 3 acres in one season. After the trees are cut off, a bulldozer pushes them into windrows where they are burned. Next season, the land is worked down with a plow and heavy disc, and the following season bears its first good crop. The snow capped 7000 foot Chugach mountains oversee the struggle, while keeping out the worst of Alaskan weather.

PAUL BUNYAN size vegetables grown in Matanuska Valley.

THE PROMISED LAND

AS THE DUSTY blue 20-passenger bus turned out of Anchorage along the 50-mile gravel road to Palmer, Alaska, a comfortably padded lady in blue slacks flagged the driver with an energetic wave. The bus stopped and Mrs. Clyde Parks got in.

"Hiya," said Gene King, the driver, "what's new?"

"An old blackie bear got one of Frank McAllister's cows last night. She was just freshen, too. Always is, isn't it?" she laughed wryly.

The driver let the bus out of first, started coasting down an easy hill. He looked hopefully at the new passenger.

"The Rempels had a baby two nights ago. They named him William Charles. You know, he's the eighteenth white baby born the first six months this year in Matanuska Valley."

Overhead a DC-3 hummed along. Looking out the bus window, Mrs. Parks caught sight of it. "I'll bet that Charles O'Donnell will be out to meet that plane to see if it brought his new tractor and Holstein heifer."

The bus rolled on to the top of the hill and the driver let it come to a stop. Beneath him, a thousand acres of meadows and forest gave off the fragrance of wild roses, and the sharp odor of spruce came in through the open windows of the bus. The meadows were pink with shooting stars and low, green dogwood vines that sparkled with white blooms. Clyde took out a pencil and reached in front of him for a pad. Turning around, he said to no one in particular, "I hear they was Indians broke all four windows in the Public Library."

"Say," called one of the women passengers, "write down about Mrs. J. F. Brown. She's taking in washing at her home for bachelors. The loggers will want to know that."

You knew you were in a strange country with tractors flying overhead and a bus stopping at the top of a hill to pick up catch-as-catch-can news.

Gene King was the ace correspondent for the Matanuska Valley *Settler News*, a mimeographed sixteen-page paper, at ten cents a copy, with the paid circulation almost ready to break 100.

A little over an hour after he left Anchorage, Gene swung his bus to a stop in front of the Farmer's Co-Op at Palmer and got out to buy an ice cream stick. He took a practiced look at the sky. It was a clear June day in Matanuska Valley, the promised land of Alaska, selected by the Federal Government in 1935 as a suitable place to settle "pioneers." Twelve years and five million dollars later, about 40 of the original 200 pioneer families were left in Matanuska Valley.

Since then, solid farm families have replaced the romantics, the drifters and the bright brains with weak backs. If all goes well in Matanuska Valley in the next 20 years, Uncle Sam will have an open door to a bonanza greater than the gold dust that has flowed from the same Valley since gold was discovered there in 1898.

Where Is It?

The Matanuska Valley is a speck, about the size of Rhode Island in southern Alaska. It is ringed by 7,000-foot mountains rising precipitously in all directions save the southwest, where the Valley opens

IN MATANUSKA, the chief building material is the log, usually spruce or birch. Frank McAllister, who is watering his Holsteins, owns this dairy barn. His dairy grossed $9000 last year selling milk at $7 a hundred. Frank milks 13 Holsteins and the Army has given his dairy a Grade A rating. He figures the average Valley's farm income at $3000 to $4000 a year cash.

into a tidewater inlet that flows from the Gulf of Alaska, 50 miles away. The remarkable feature of the Valley is that while the mountains keep out the worst of the weather to the north, the opening on the southwest admits air from the Japanese current that warms the Alaskan coast.

The Valley floor is from 36 to 400 feet above sea level, and the entire area, including the foothills and mountains, is about 20 miles wide and 60 miles long.

From any part of the United States, Matanuska is no more than a two-day plane trip plus an hour's bus ride. Steamers from Seattle get within an 8-hour railroad trip of Palmer in 5 days. By automobile it can be reached via the Alaskan Highway in a 2 week's trip from the States.

The Valley's people number 4,000 and for the most part they are isolated from the world by mountains, distance, and bad weather. They speak of going to the States as going "Outside."

The Main Idea About Matanuska

On the surface it seems that while 4,000 people are indeed 4,000 lives, the amount of newspaper space, government money, and international publicity given this settlement is absurdly disproportionate to the amount of attention most of us receive from the press in our farm communities. But there's a profound reason behind the ballyhoo.

The original idea was to take care of a few landless poor, while the present hope is to feed Alaska from within with Matanuska Valley as one of ten garden settlements in the Land of Frozen Wastes.

Matanuska Valley was settled in 1935 by 200 colonists from northern United States who were offered land, credit, and loan of machinery. It was a social experiment in relieving rural charity rolls. Many people speak kindly of the basic idea, saying it was evolved to put the little man back on his feet with his own home and his own land. Whatever the motives, when the 200 colonists arrived at Matanuska, after being eulogized and elaborately dined by the Chamber of Commerce at Anchorage, any G. I. could have foretold what happened. The door knobs arrived before the doors, the roof before the rafters. Farms were drawn by lot, a six-room house often going to a childless couple, and a two-room box to a family of six children.

Monthly credit in "bingles" was handed out and the colonists' ladies went on a buying binge that included evening dresses for Sunday morning church services. Most of the men were not farmers, and those who were tried to plant the same things in the same way that they did in northern Michigan, and Minnesota, and Wisconsin. The people had a rough time of it. By 1938 the colonists who returned to the States had filled reporters note books with bitter tales of government-by-triplicate forms.

It looked for a while as though the Department of the Interior might lose one of its bureaus when the thinking of the late thirties got off the subject of 200 relief families and onto the subject of the laws of national survival. Russia and Germany decided it was to the interests of both parties, temporarily at least, to declare a truce. The American Army moved into Alaska in force. First off, the Army wanted fresh milk and vegetables, of which there weren't enough grown in all Alaska to feed a single division. Most of the food consumed in Alaska in 1939 by the 90,000 population (of which 30,000 were Indians) came from "outside."

You cannot settle a colony without a rising birth rate, nor can it multiply without a local food supply. Otherwise, the economy will be based upon minerals and other natural resources which, when once used up, no longer provide a medium for the exchange of food.

The future of Matanuska Valley changed when the Departments of the Interior, Agriculture, and War got their heads together. The USDA, never one to let grass grow unobserved, installed a station in Sitka, Alaska in 1898. It has also been working quietly in Matanuska Valley since 1915 in a little field station which started with 12 acres divided into multiplots for experimentation. That the Department of the Interior failed to use these findings to the fullest extent when planning the Matanuska Valley Project in 1935 is one of the niceties of civil service.

Seen broadly, the problem was: How to feed and clothe Alaska from within, and increase its white population. The imme-

PIONEER FARMING has many advantages in Alaska. The icebox set in the mountain stream that flows past newcomer Balogh's home keeps Anne's milk cold. In the stream are trout and salmon. Her folks make big hauls in season and deep freeze their catch at the farmer's Co-op for wintertime eating. The children are all healthy, and strong like farm kids everywhere.

FATHER SNEED is as good a showman as his brother Sam is a golfer. He keeps a frisky, intelligent monkey as a parish pet and the kids love to pass by and watch Alaska's only simian beg for gumdrops.

diate problem of Matanuska Valley was: How to grow small cash crops while the USDA field stations labored to develop a hay that would not winter kill, for on a grass economy rests the future of Alaska. *If the 60,000 tillable acres in the Valley were eventually cleared and planted to row crops or grain, and the 156,000 acres of forested foothills seeded to a hay that would not winter kill, Matanuska Valley could feed 50,000 people.* So reasoned the USDA.

There are ten sections in Alaska almost as temperate as Matanuska, or even slightly more so, and once a successful agricultural community is established in one of them, the others could adapt the program. Granted a teaspoon of hay seed that will not winter kill, but will seed itself abundantly, Alaska in 20 years can feed a population of a half-million, from home grown crops. After 47 years of experimentation, the USDA is still far away from a hay crop that will spread in Matanuska the way lespedeza took over the South.* Meanwhile, short season cool crops (peas, potatoes, cabbage . . plus fresh milk, have provided enough cash to support 300 farm families who live in the Valley today.

The Farmer's Gripes

In the Battle of The Bulge, German soldiers in American uniforms, equipped with dog tags, passwords, serial numbers and faultless U. S. idioms, tried to pass through American lines. They were ar-

*Dr. Ralph G. Mills imported a spoonful of lespedeza from Korea in 1919. That year test plots were planted by the USDA. In 1946 over 40,000,000 acres were planted in the United States to lespedeza. For the complete story of lespedeza see FARM QUARTERLY, Spring 1946.

rested when a sergeant who asked for their papers became suspicious when they failed to gripe about anything.

The farmers in Matanuska Valley exert their universal American right and perhaps a good way to understand what the other fellow puts up with is to look over the thing he's kicking about.

The first gripe of the Matanuska farmers, as of farmers everywhere, is the weather, which is never right, and the winds, which are always present. In lesser degree the farmers complain about the abundance of well paid part-time jobs in mining, logging, railroading, and fishing, which take away their hired hands; the tendency of the Army to order vegetables in enormous amounts and then to "discover" tons of the same in a warehouse at Fort Richardson, and then to cancel orders; the prowling moose and black bears; the difficulty of growing crops cheaper in Alaska than they can be shipped in from the states; the back-breaking process of clearing an acre of ground and the extra season it takes to condition it to the plow; the lack of enough farm machinery; the annual longshoreman's strike, and the high price of feed, fertilizer, legume hay to which is added a $26.60 a ton shipping cost from Seattle.

What's Good About It?

For every Alaskan hardship there are compensations: Great, wide open territory, freedom, the chance to grow with a new country, the attraction every American has in his bones for a pioneer country, no polio, no plagues, no rats, no snakes, fewer insects, abundant hunting and fishing, numerous opportunities for part-time jobs, fewer traffic accidents, less disease, very high prices for crops, no farm land taxes, no food rationing, the chance to be a big frog in a small pond, less social affectation, many churches and a good school, the chance to start over again for less capital than it takes elsewhere, the stimulating opportunity to pit yourself and your family against nature and subdue her and win her rewards and the esteem of your neighbors, the sense of danger from the natural elements that keep men alive and on their toes. A Mississippi tenant farmer, on the average, is a shadow of the man cast by the Mantanuska farmer, because nature lulled one to sleep and made the other move if only to keep warm.

The people of the Matanuska Valley reflect their climate and their surroundings. They are stubborn, tough, and resourceful. The others don't last.

The Weather in the Valley

The reason so much tame hay in Matanuska winter kills is due to a phenomenon known locally as "glaciering." The rains and occasional warm "Chinook" and "Knik" winds coming anytime during the winter, form a sheet of glare ice caused by the alternate freezing and thawing of the snows. Glare ice effectively smothers out the hay and freezing heaves the roots out of the ground. Were it not for this nasty trick of nature, Matanuska Valley would be the garden spot that the 200 colonists believed it was when they went there in 1935.

Although the natives say there are only two seasons, winter and the Fourth of July, the people are healthy, and the weather is more liveable than in the coldest fourth of the United States.

Spring is a season in name only, as frozen ground persists into the summer. The climate is determined principally by the Japanese current, which comes in close to the southern Alaska shore, and the high mountain ranges which keep out the storms from the north. The lakes and inlets around the Valley temper the cold and prevent sudden changes in temperature.

Theoretically, there are seven hours of daylight in December, but in the valley itself the sun chins itself for only a short time between the high mountain peaks.

One Illinois farmer arriving late in November left by plane early in February with a terse farewell comment: "It's too dark."

On June 21 the sun rises at 2:00 AM and sets at 10:00 PM. There is no darkness. An all night twilight begins April 20 and is last visible August 25. The typical June day starts with a clear sky, but during the early forenoon clouds form over the surrounding mountains; by noon these are usually scattered over the Valley and solid over the mountains, and during

THE SPECIALTY CROP of Matanuska Valley is tomatoes and they grow so big and luscious that Ruben's or Lindy's could get $1 apiece. Plants are set out in June under hot caps.

STEP ONE. The birch trees are chopped down, the great stones left by the receding glacier are lugged off, and a little livestock run in to eat off the forest cover. In the background is a typical pioneer home with tiny greenhouse that is dismantled in winter.

the early afternoon light showers generally occur over the mountains and sometimes over the Valley. Around 4:00 PM the clouds begin to disappear and by 10:00 o'clock, or shortly after sunset, they are gone.

On nearly every Sunday and holiday throughout the year, people go picnicing, boating, hiking, hunting, fishing, berry picking, mountain climbing, skiing, or skating.

ANNUAL METEOROLOGICAL REPORT

	Maximum	Minimum	Monthly Mean	Total Precipitation	Snow in Inches	Clear Days	Partly Cloudy	Cloudy
Jan.	35	–23	7.1	0.66	15.7	4	5	22
Feb.	56	–22	25.4	0.42	4.0	8	13	7
March	46	–4	24.0	0.62	4.2	4	16	10
April	60	6	37.8	0.17	2.0	3	16	11
May	73	31	48.2	0.51	0.0	5	10	16
June	83	38	57.6	1.84	0.0	1	12	17
July	73	40	46.9	1.59	0.0	2	5	24
August	81	38	55.0	4.42	0.0	2	19	10
Sept.	3	31	47.9	3.69	0.0	0	10	20
Oct.	56	11	39.6	0.39	0.2	5	13	13
Nov.	47	4	31.8	2.33	3.7	2	5	23
Dec.	46	–9	26.6	1.50	12.2	0	10	21

Total Precipitation, 18.14 inches.

Total Snowfall, 42.00 inches.

Clear days, 36; Partly Cloudy days, 134; Cloudy, 194.

The last killing frost is usually between May 20 and June 1, and the first killing frost in autumn may come as early as September 1. In the summer time you can find ice by going 500 feet up the forested foothills and digging a foot into the moss that fills shady low spots. The growing season is about 100 days. To farmers the most aggravating month of the year is April, when the weather is bright and sunny enough to plant crops but the ground is still frozen hard and plants cannot be set out.

Is winter really tough? Betty Mears, a Valley resident, says: "The roads, by late winter, are narrowed to a single track. When a moose gets into the road he finds easy going, and may dispute the right-of-way with any car that happens along. He seems to have no fear—though not curious as the bear—and if in a bad mood won't hesitate to attack a car, sometimes turning it over, and making it subject to a body-and-fender job.

"What do you do while the moose is working over the car? You stay in it, and hope for the best, for despite all the tales of narrow escapes, there are no verified stories of a person being seriously injured with one of the animals, moose, that is."

You prepare for winter here just as you would anywhere there is real cold. Light flurries of snow develop from the September drizzle of rain. In the afternoon there is a fresh breeze from the north smelling of spruce and snow and cold. The birch and alder leaves swirl in

streaks of orange and brown. The line of snow in the mountains slowly slips down the slopes to the valley; then another snow in the hills brings it along a little further. The brilliant magenta fireweed that framed the roads and fields in mid-summer and flowed slowly up the hillsides to above timber line turns an entire mountain side into a haze-muted rose. In late September, it releases a hoard of dandelion-like seeds for next summer's show.

The Winds Box the Compass

There are two winds which the farmers have learned to recognize. "The Matanuska Wind" enters the Valley from the east-northeast and occurs most frequently during winter and spring. It is usually very cold and sometimes violent, continuing for several days at a time. In Palmer the air can be still without a twig moving, but the roar of a Matanuska wind blowing through the Valley several miles north sounds like an express train thundering across a bridge. West of the Matanuska River, the entire woodland cover of the Valley leans to the leeward.

"The Knik Wind" comes in any season of the year blowing from east-southeast and is warm, causing winter thaws.

Winds blowing down the Matanuska and Knik River Valleys pick up all the finer materials on the bars and shores. The sands drop out close to the river banks, but clay particles are carried many miles to the westward. These wind-borne materials have been dropping for thousands of years on forests, swamps, and lakes, and have built up a fertile soil over the glacier moraines.

Before the rains start in late summer there is a lot of dust—a fine swirling dust that rises in alarm with every passing car and settles reluctantly. It seeps into a car, no matter how tightly closed, until after a few miles you look like you might have gotten out and rolled in it. Roadside growth becomes brown with it and indistinguishable from the road itself. Wild berries, great luscious red raspberries, currants and cranberries need to be washed off before you eat them.

Crops

One of the reasons the first settlers in Matanuska Valley, brought there by the Government in 1935, failed to make a living was that they tried the same farm methods in Alaska that they were used to at home. If they didn't work the second time they usually quit. Early settlers tried grain, potatoes, and hay. Today the emphasis is on potatoes, dairy and truck gardening. There is good reason for this. Only 9,000 acres in the Valley have been worked down fine enough to accept a row crop, and there isn't enough hay pasture yet to support large herds of livestock. Since pasture is so limited, experience showed that the best farm crop in which to specialize was any cold weather crop

STEP TWO. The next season, a bulldozer pushes the shallow stumps out of the ground into windrows, and the litter is turned under. It's a job for a heavy duty tractor.

STEP THREE. Five years later, the ground is smooth and rich. Because of the frequent high winds, it cannot be left without a cover. When you read about folks "carving out a home themselves"—it's Alaska they can be talking about.

FRANK BALOGH and his family came to Matanuska Valley from Ohio. They built this log cabin, cutting the trees from the land they farm. A week after they moved in, Frank was in the fields, and Mrs. Balogh was getting dinner, when into the open half of the Dutch door, a bear poked an inquisitive head. Mrs. Balogh screamed and the bear hit the bush. A loaded gun is now above the mantle.

that could be sold for cash, rather than a grain crop to be fed to livestock.

The chief crop of the Valley is potatoes, planted on about 2,000 acres and yielding an average of five tons to the acre. The soil is friable enough so that before the settlers had machinery, potatoes were dug by hand. Typical of the difference between the farmer and "the good farmer" is Earl McHenry who grew 15 tons of seed potatoes to the acre, harvesting them by hand, while his neighbors grew 5 tons of table potatoes.

Second in importance to potatoes are the cold climate vegetables, cabbage, cauliflower, broccoli, kale, kohlrabbi, lettuce, chard, celery, spinach, parsley, peas, turnips, rutabagas, beets, and parsnips.

Almost any crop that grows in the Matanuska Valley is larger in size and has a better flavor than that grown in the States. Occasionally, you will see picture postcard scenes of mammoth Alaskan crops, 50-pound cabbages, potatoes as big as a hat, and turnips as big as a man's pot belly. More often these are "show pieces" with soggy centers grown at Circle Hot Springs where hot water from thermal springs is piped through the land to permit the growing season to begin with May. When these vegetables are picked early they are luscious and beautiful. When they are allowed to grow to gargantuan size they are beautiful but not marketable—first, because of their size. and second, because they are either tough or soggy.

There are no orchards and the only cultivated fruits are strawberries, red raspberries, currants, and gooseberries. Growing wild in the mountain foothills are crowberries, cranberries and cloudberries.

The cloud berry is one of the unusual local plant stands. It grows about four or five inches high with a berry about the size of the end of one's little finger. It is yellow and made up of large, juicy kernels.

Corn cannot be produced in the Valley due to the short, temperate growing season, but this is not a serious handicap, because Valley-grown hulless barley is almost equal to No. 2 yellow corn as feed for livestock and poultry.

Highly specialized types of farming, such as cranberry growing on bogs, are possibilities. There is fox and mink farming on high land, and muskrat and beaver farming in the marshes.

Several varieties of canning peas do particularly well in the Matanuska Valley. Peas are not troubled with the pea weevil or other insects. The yield is heavy, and, as is true with all crops grown there, the quality and flavor are exceptionally good. The flavor is due to the ample moisture, cool temperatures, long days, and the fertility and fine texture of the soil.

Surface soil conditions vary from well-drained soils to swamps. The well-drained lands of the Valley are usually covered with forests, predominantly birch, with shallow roots. The bottom lands, subject to periodic overflow, are covered with stands of cottonwood. Birch forests usually mean well-drained soil with one notable exception—some birch forests have their feet in the water because of the constant dam-making by the beavers. In a few

years, the birch dies and the marsh and swamp vegetation quickly takes over. In the birch forests are reed grass, mosses, low-bush cranberry, high-bush cranberry, trailing dogwood, fireweed, horsetail, wild rose, and several types of ferns.

Red Salmon, For Free

If you are fortunate enough to live near one of the little creeks, such as Fish or Cottonwood, up which the salmon run each year to spawn and die, you can hear them during the summer as they fight their way up in hoards. You see the splashing, while the creek turns red with them. Then you may catch with snag or gaff as many as your conscience will allow or your needs for winter dictate—to smoke, brine, pickle, deep freeze, or can. As the salmon spawn and die they wash down the creeks with rotting flesh red and are discouraging to the meticulous. You may see a black bear fishing for the easily caught red bodies, or gorging on fish heads and entrails left by a fisherman anxious to lighten his load to take home. This is no small item when you catch thirty or so of four-pounders. (And what wife wants to put up with the remains of that around the place?)

Soil

The soil mantle is in most places less than 12 inches in thickness, and, with a few spot exceptions, never more than a yard deep. Nearly all the soils consist of a thin veneer of loamy top soil over coarse gravelly deposits. This thin layer is susceptible to wind erosion. In early summer, seeded fields have been "blown out" by strong winds. Even where the surface soil appears to be a bed of poor gravel the woodland cover is usually good. On cleared land where crops are grown it is frequently difficult to locate bars of gravel in otherwise good soil by means of their effect on crop growth. Only during periods of drought does the diminishing plant growth become especially noticeable.

Drainage, more than soil, determines the capability of the land. A great deal of land is permanently wet, most world travellers agreeing that Matanuska Valley soil wetter than any place north of the tropics. The Valley is so young geographically that it has not developed surface drainage. The earlier presence of tens of thousands of small icebergs left innumerable, sunken kettles now marking the surface. Moss, which grows almost everywhere, fractionates the rain drops on impact and protects the surface against water movement. The moss serves as a spongy reservoir and its mulching effect cools the soil surface sufficiently so that relatively little water is lost through evaporation. This is why the Valley is suitable for agriculture although receiving only 15 inches of water annually.

Everyone of a large beaver population works day and night to impede drainage. The subsoil is frozen tight 7 months of the year so subsurface drainage and seepage is small. Water loving plants grow abundantly as forest cover.

Nowhere is there barren ground here; every inch that isn't perpendicular is covered thickly and deeply with various growths. They say that if you've been here long enough your walk will show it, and brand you forever as an Alaskan. It's a wary, cautious step you develop from walking over the soft tundra where you may go down suddenly without warning, clear up to your knee, until you've learned to move instantly when your footing disappears.

Stock

As has been said before, livestock only awaits the development of better pasture seed and a hay that does not winter kill, although 6,000 acres of native mountain foothills are now being pastured. However, the wild hay is palatable only for a short season, and when pastured close or cut annually will winter kill.

The USDA report says: "Mountain pasture can carry six to seven cattle on 100 acres for the entire summer." Since ordinary Indiana pasture will carry one cow per acre, the Matanuska mountain pasture is seen at its relative value. But Alaska is the "Great Land" and the mountain pasture is truly big. The USDA reports that if all of it were utilized in the Matanuska area, even the poor quality wild hay would support 20,000 more cattle plus 60,000 sheep during the four months of June through September. The grain potential of the Valley's crop land is more than enough to feed that amount of cattle during the remaining eight months.

None of the farms are strictly dairy farms and there are no big, white dairy barns as you see them in Wisconsin. Relatively few farmers have more than ten or twelve milking cows and most of them have fewer than six or eight. The total milk production in the valley last year was 2,500,000 pounds from 426 cows. Five years ago it was only a tenth of that amount.

In the Valley the preferred hay or silage mixture is peas and oats. For cows, cotton-seed or fish meal are the usual supplements fed. Protein supplement helps make up for the lack of plentiful roughage. A Guernsey in Ohio producing 9,000 pounds of 4.5 milk will provide 8,000 pounds of 4% milk on an average Matanuska farm due to lack of a long, lush pasture season, and the lack of plenty of good hay.

Farmers in the Valley pay 35c a hundred for shipping a hundred pounds of

(Continued on Page 132)

PALMER, Alaska, is a drinking town and there are more bars than any other kind of store. One sheriff keeps order. Outside the town, disorderly or drunken conduct is a federal offense. "Cokes" and "Pepsies" are the teen-age favorites.

Movements of the brilliant aurora borealis are strange and unpredictable. Often, in the upper atmosphere, orange or yellow mist-like festoons are suspended. Sometimes they spread like a luminous curtain across the whole night sky.

FERTILITY THIEF NO. 1 on many a livestock farm is the exposed barnyard manure pile. The $16.00 per ton fertilizing value can be leached in half by three months of snow and rain. In a well-managed grass farming program much of the manure is spread on the fields by the grazing animals. That from the buildings is carefully protected until it can be spread on the pastures.

GO TO GRASS

BY C. M. LONG

LAND used to be put in grass pasture when it wasn't good for anything else. In the dairying regions such pastures were little more than cow gymnasiums, for they provided the cow with sunshine, fresh air, and lots of exercise but with very little feed. Today, the words "grass farming" mean: Grow grass and small grains, buy your corn, and increase your herd of cattle to get the extra income that pays for the corn. The extra cattle means extra manure, and the absence of row crops mean less field work. Grass farming is a revolution that is taking place among the farmers who have dairies or who feed cattle or sheep for the market.

I think of grass farming as nature's way of handling soil, so the farmer can expect cooperation from her as he goes along. When a farmer goes into a planned program of grass farming, he first puts his easily eroded fields into permanent grass stands. He will use such long-season, soil-building legumes as alfalfa, ladino, red or mammoth clover, and alsike, mixed with such soil-binding grasses as brome, timothy, orchard grass, and fescue in combinations best suited to the land. The important point is that he will apply manure, lime, and fertilizer to this land in quantities that will provide for maximum production. Land which is not subject to erosion will be put in a rotation of grass with small grains. This will enable the legumes to be renewed every few years and allow the deep application of fertilizer.

The advantages of a grass program are: first, it is the fastest way to improve or rebuild the soil; second, it is the surest way of controlling erosion. Its third advantage: it brings greater profit from land in pasture and hay. Some farmers, even in the best soil areas, are finding they are making more money from their fields which are in grass in the so-called "rest years" in between corn crops, than they are in the cash crop years. In fact grass should be regarded as a cash crop the same as corn, if the farm has a livestock program. Its fourth advantage is, it reduces the labor costs (and that has be-

come no small item) by as much as one-third. There are other reasons why grass farming has caught the eye of the practical farmer. It has enabled him to increase the carrying capacity of his farm in terms of ruminants (cattle, sheep, goats). Hogs, too, respond to fine pastures and high quality hay, but more grain will be needed than for ruminants. Increasing the carrying capacity of a farm as one farmer put it, "is the same as owning land without paying for it, or paying taxes on it."

When the Tide Turns

When milk prices drop back to $3.00 a hundred, with 5c a point for butterfat, a 200 acre farm carrying the extra capitalization of the right kind of buildings and modern grass-handling equipment put into it during the high dollar years of 1943 to 1948 will live better on a grass farming program with 100 head of dairy cattle than with 50. Grass farming permits a 200 acre dairy farm to handle a 100 head herd, including the yearlings and calves, with about the same amount of labor that was required for 50 in a regular rotation. With a grass program the fertility of the soil is maintained with the use of legumes, the additional manure, and it is not depleted by row crops.

What Grass Farming Isn't

Some people think that grass farming means reducing the corn ground by putting some of it into alfalfa, or, putting a back field into a permanent pasture which is given no further attention. That kind of grass farming is a horse of another color. When we say we are putting a farm, or part of a farm, into a "grass farming" program, we mean we are going to raise grass and small grains on it, and nothing else. But we are going to give our grass lime fertilizer, and manure in quantities for maximum production. Because of the larger amount of nutrients in the grass when it is grown in a program of this kind, the longer season of fine pasture and higher rate of production of grass silage and hay, more animals can be carried. Less labor is required for field work, since the animals are put to work harvesting their own feed. By using movable silos, movable field hay mows, movable feeders and watering troughs, we can almost eliminate manure spreading, for the animals will spread it themselves, where it is most needed. Less grain will be required per animal since they get most of their food from grass, hay and legume silage. Because of the extra income from carrying more animals and less expense in handling them, the farmer may want to buy part or all of his corn, depending on its price.

The experience that my associates have had in working with farmers in the Midwest and analyzing several thousand acres of good, poor and indifferent land, has convinced them that a grass program would be the best answer for 75% of this acreage, from the standpoint of maintaining soil fertility and increasing the farm's net income.

Grass farming has been "discovered" by a lot of people in the last eight years. In Indiana, we have worked mainly with two classes of people: (1) farmers who have seen the fertility of their farms decreasing and who want to reverse this trend; (2) farmers who have fine, almost inexhaustible soil who want to reduce the costs involved in handling animals and producing milk or meat.

I'm Making Money—Why Change?

Let's take a specific case and follow it through in a change to a Grass Program. One Illinois farmer came to me with this question, "I'm making money off my farm, but some of my fields are gradually losing their top soil; what shall I do?" One field in particular, which he had in corn in 1947, and which is shown on page 72, was developing gullied areas. Enough top soil had slipped away in these areas to make the corn practically a waste of time.

After a study of this farm, its soil types and slopes, we recommended a change to a grass farming program. This man was in the dairy business; he had a good herd of Guernseys and was in the milk-shed of a large city where he got a good price for his milk. He knew his animals and he was in a position to make money from a grass program.

He came back to me with questions which are typical of those that farmers ask when the subject of grass farming comes up. "Why should I change over to a grass farming program, buy several new pieces of machinery, spend a considerable amount of money on grass seed, fertilizer, lime? Why should I increase my herd and have more work, when I'm making money now?" To this question we gave him the following answers. His last four years' cropping schedules are shown on page 70.

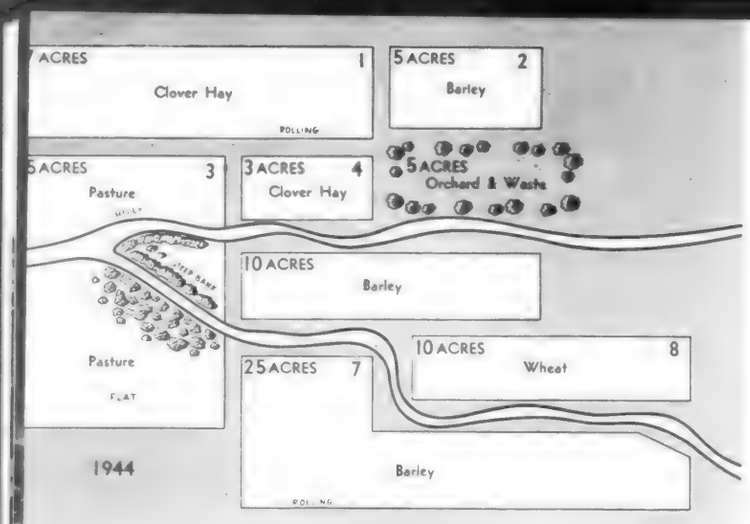
(1) You can sell the farm now and realize a good price, for the erosion damage is not severe; or,

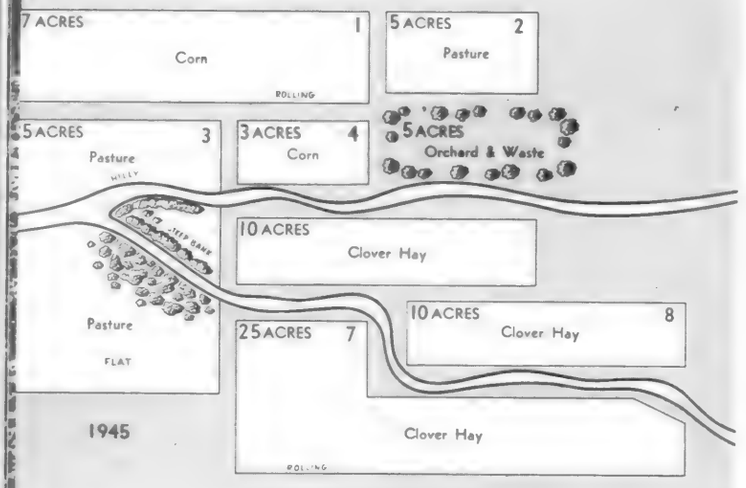
(2) You can watch the farm wash away slowly, make a good but probably decreasing profit on it each year, then sell at a low price in, say 10 years from now. By then the erosion will be noticeable and will affect the selling price; or,

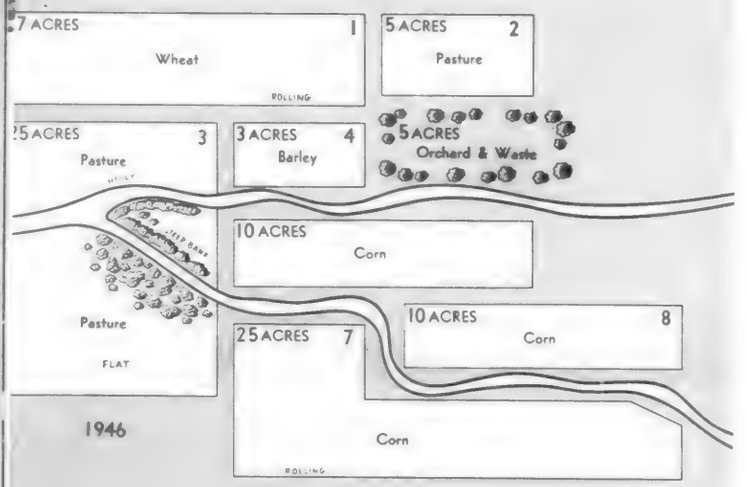
(3) You can rebuild the soil of the farm and hold onto it as a profitable dairying operation.

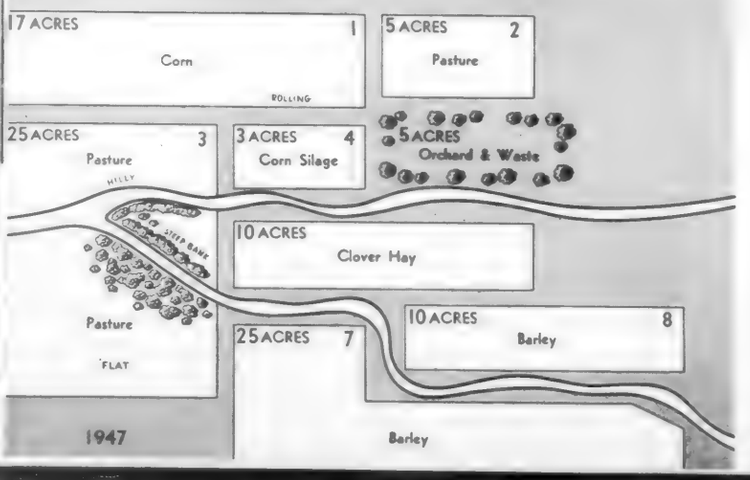
This man had the same problem that faces many a farmer today. He had been making a good profit off his farm with the present high prices at the expense of his soil fertility. In the long run, he would have to pay the bill with either a pro-

ANIMALS are part of any grass farming program. They convert the fine pastures and hay to meat and milk. It takes more intelligence and careful planning to handle good stock, like these Aberdeen Angus, than it does for ordinary farming.









THIS IS the usual 4 year rotation, with which most farmers are familiar. On the gently rolling ground of this Illinois farm the one year of corn was taking off more fertility than could be built back in the other three years. For the change to a grass program see the next page.

gram of rebuilding the soil or by selling his farm at a price which took a discount on its lost fertility. To put that fertility back would mean a change in method and that would cost money, although in the long run it would be the cheapest solution to his problem.

How I Do It

The steps he had to take to go into his grass farming program were:

(a) Lay out the farm on a program to stop erosion and rebuild the soil—a grass program.
(b) Obtain the machinery needed for efficient grass farming.
(c) Increase his herd to harvest the crop and turn it into a profit.
(d) Determine and increase, if necessary, the shelter space for the animals and storage space for the hay, ensilage, and straw.

The farmer, being of Scotch extraction, asked these six questions:

What's it going to cost me to:

(1) Change to grass?
(2) Get the necessary machinery?
(3) Increase my space?
(4) Increase my herd?
and
(5) How much time will it take to handle double the number of cows?
(6) How will my new income compare with what I'm getting off the farm now?

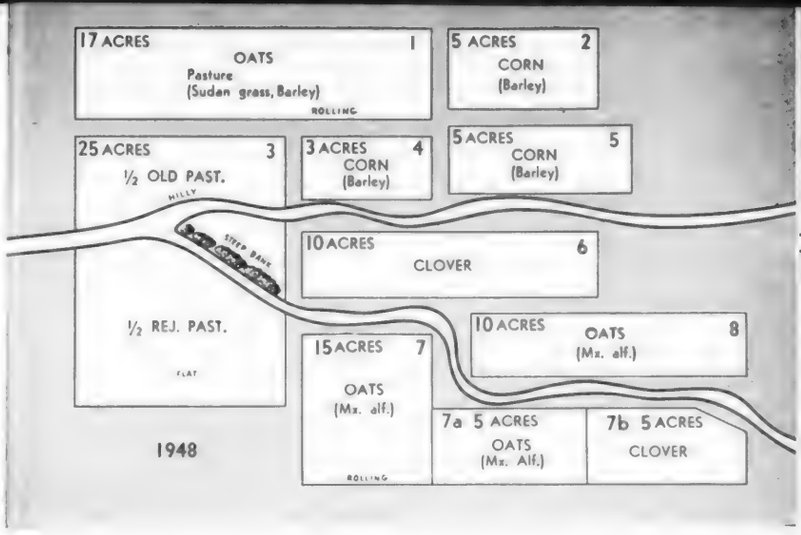
The method we suggested for carrying out the steps in the program above and the answers to his questions went something like this. We recommended that he change to a grass program gradually, over a period of three years. Our field-by-field recommendations for each year are on page 71. In this time he would be able to build up the number of cattle in his herd, rather than go out on the market and buy milking cows. He had 17 animals, of which an average of 9 were being milked. We figured that when he was on a complete grass program he could carry 34 animals with an average of 20 being milked. Making a profit on the farm would depend upon managing this larger herd with the same good performance as had been maintained with the 17-animal herd. He had average 8000 pounds of 4.5 milk per cow and had been able to meet the requirements of Golden Guernsey milk production.

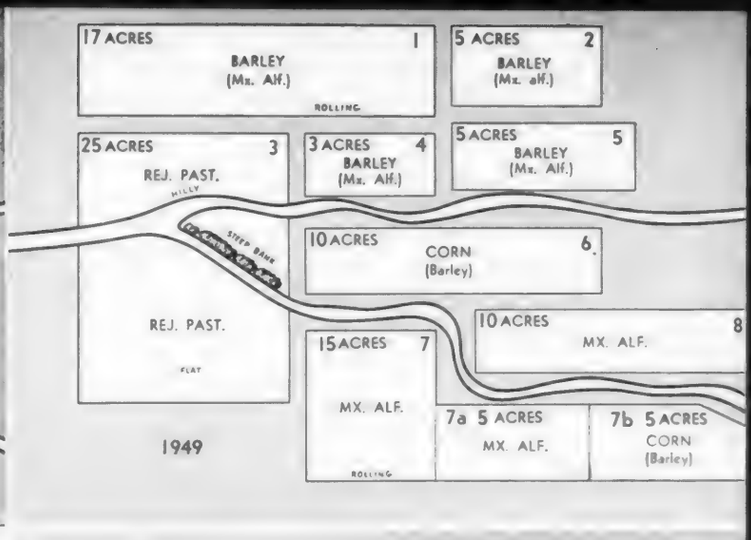
Over the three-year period of time he would also be able to find the time to make the changes we suggested and bring the pastures and hay up to maximum production. He would not have to spend cash for grain until the third year. By that time his income from the increased milk production would have also stepped up, and he would be able to afford it.

One of the first fields that we suggested should be overhauled was the big 25-acre pasture (Field 3) where there were two of our worst fertility robbers, a grove of trees and a running stream. I am not against trees nor streams. There is a definite place for them and we would have a dreary countryside without them. But the place for trees is not in a pasture. If a man loves his trees they should be fenced off and protected. Stock grazing near them will ruin them. For the farmer the worst feature of having trees and streams in pastures is the loss of soil fertility, because manure is concentrated in both places.

Why Pastures Get Thin

One reason pastures have continued to lose fertility is the farmer's lack of understanding of manure management. Animals





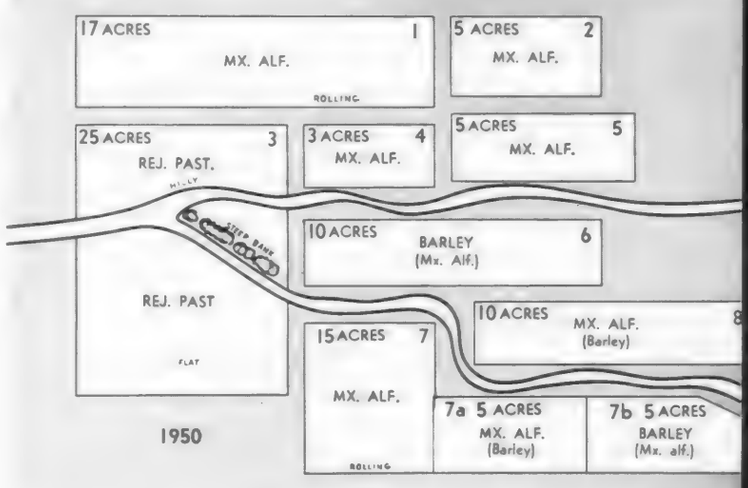
consume nitrogen, phosphorus, and potassium in making milk and meat. In the form of manure, milk and wool producing animals will return to the soil over three-fourths of these minerals they take out by grazing. Beef cattle return practically all of it. Research has shown that 100 pounds of milk sold removes from the soil 5 pounds of nitrogen, 2 pounds of phosphorus, and 1.8 pounds of potassium. The problem is to get the manure back on the soil and in the parts of the field where it is needed. Good farmers don't like to sell their hay, but few give proper care to the fields that grow it.

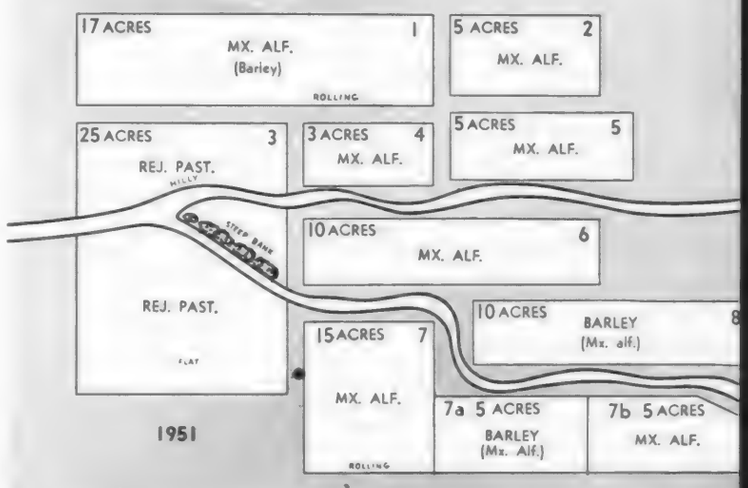
Alfalfa, if it is cut 3 times a year and averages 3 tons per cutting, will take 144 pounds of nitrogen, 33 pounds of phosphorus, 132 pounds of potassium from an acre. Corn, which we think of as taking much fertility out of the soil, takes 36 pounds of nitrogen, 24 pounds of phosphorus, 32 pounds of potassium on a 60 bushel yield.

Very few farmers would think of growing corn year after year in the same field. Yet many will cut alfalfa hay three times in a year for two or three years and then fail to return all the manure or adequate fertilizer to the field. So, if we pasture alfalfa with dairy cattle, 85% of it goes back. If we take it off as hay and return unleached manure 65% to 75% of it goes back. If we take off either alfalfa or corn and sell it we lose the above amounts of essential minerals.

A cow spends about one-third of her time eating and two-thirds of her time resting and ruminating in the shade, if she can get there. And if you give her shade *and* a stream, you can count on at least two-thirds of all her manure floating away to someone else's farm.

And have you ever noticed how long and lush the grass grows in the shade of a few trees in a pasture? And wondered why the stubborn cows wouldn't eat it? There is often a line that looks like the edge of a lawn mower's cut. Well, it's for the same reason that a "red" apple that hasn't received enough sun to make it red is unpalatable. Apples or grass need the action of the sun's rays to convert them into nutritious food. In addition, the extra manure in the shade puts so much more nitrogen in the grass that bossy just doesn't care for its taste.



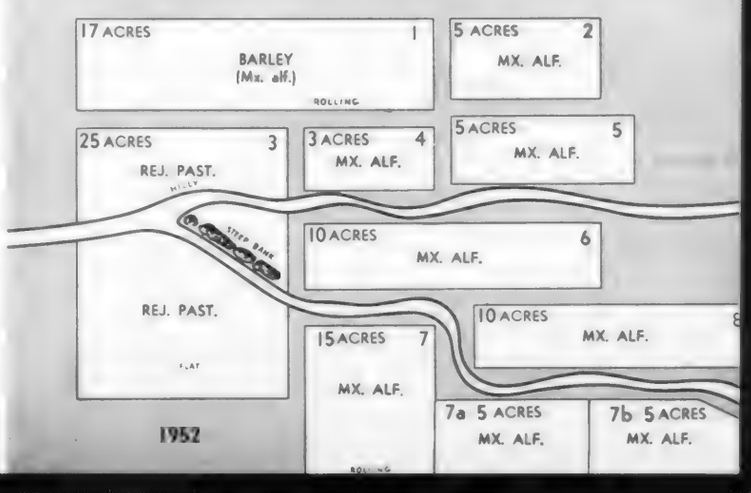


The Land Use

The program which we recommended for this farm was as follows:

The fields of this farm except No. 3 which is in pasture will be operated in a five year rotation consisting of small grain one year and mixed alfalfa four years. This will replace the old indefinite rotation beginning in the spring of 1948. The diagrams on this page show the crop and the proposed land use from 1948 to 1952.

THIS IS THE WAY this farmer will handle his fields when he goes to grass. It will take him five years to get there, but when he does he'll double the animal carrying capacity of his land and start rebuilding his fertility.



WHAT would you do if your cornfield looked like this on August 10? This is Field No. 1 (17 acres) in the farm shown in detail on pages 70-71. The gullied areas, circled in white, were indications of the amount of top-soil that had been lost from the farm. They made a convincing point for nature in her argument that this type of soil was not suited to corn farming. Now this farmer is changing to a grass program. A look at a farm from the air often will disclose how fields are performing.

When the program is in full operation no corn will be grown on the farm. Corn has been eliminated for the following reasons:

First, this ground is rolling, and has been severely cropped with corn and other grain for many years. This treatment has caused about half the top-soil to erode away in most places and all of it in a few places. It has caused the beginning of several gullies.

The second reason that corn should not be grown is that this farm is in a corn surplus area. There is a great deal of land nearby much better adapted to corn.

The third reason that corn is not in the rotation is due to the fact that dairying is more profitable in this area than grain production.If that were not true, then the farm should be terraced and contoured and grain production would be followed. The farm has only 100 acres of tillable land, which makes it necessary that some intensive type of farming be followed. Leaving out the corn enables the owner to carry more cows.

Corn is generally cheapest at picking time in the fall. At this time a sufficient quantity of corn to take care of the cattle should be purchased and stored on the farm.

Certain fields will need special treatment. Field 5 is an old orchard. This should be eliminated and the field put into the regular rotation.

Field 3, 25 acres in extent, has been in pasture for many years. Parts of this field are too rough to run any kind of machinery over. There is a great deal of brush and some trees on the field. The brush and all the trees except those useful for saw timber should be eliminated and the parts of the field that can be cultivated should be put into what is called a rejuvenated pasture. A bulldozer could be used and the cost would be about $75.00.

How to Rejuvenate a Pasture

To rejuvenate a field it should be limed at the rate of one ton of limestone per acre. It should be heavily pastured when the grass first starts early in the spring. As soon in April as it is possible to get onto the land it should be worked up with a field cultivator and disked until a good seed bed has been prepared. Then a grass mixture consisting of 6 pounds alfalfa, 4 pounds mammoth clover, ½ pound ladino clover, 4 pounds Southern brome grass, and 2 pounds of timothy should be seeded with a wheat drill at the rate of 16½ pounds per acre. At the time of seeding, 500 pounds per acre of 0-12-12 fertilizer or its equivalent should be applied. The livestock should be kept off this seeding until the first of August if the season is normal and all summer if it is dry. After the first year it can be pastured all summer. It should be rejuvenated every fifth year. Rejuvenating a pasture by this method will cost $12 to $16 per acre.

The fourth year the mixed alfalfa fields which are indicated as permanent pastures should be plowed in late August and the land prepared as if for wheat. Barley should be seeded with a wheat drill along with 300 pounds of 0-12-12 fertilizer per

acre. If the moisture in the fall is plentiful the barley can be pastured by the cattle until snow falls. It can be again pastured about a week or ten days in the spring if it is desirable to cut it for grain. If more grass is needed, it can be pastured throughout the season instead of being cut for grain.

As soon as the barley is off, the ground should be thoroughly disked and cultivated and kept cultivated throughout the summer until the first good soaking rain in August, at which time the field should be seeded to mixed alfalfa. The mixture should consist of 8 lbs. of alfalfa, ½ lb. ladino clover, 4 lbs. Southern brome grass, and 2 lbs. timothy, seeded at the rate of 16½ lbs. per acre. In the fall, after the field is seeded to barley, two tons of dolomitic limestone per acre should be applied. If the test shows that more than two tons are needed to correct the soil acidity, the remainder should be applied at the rate of two tons per acre at intervals of one year until the amount necessary for correcting the acidity has been put on the land.

Reseeding Alfalfa

It is not desirable to put all the land down to mixed alfalfa at one time. It is necessary to reseed this alfalfa about every fourth year, or it would all play out at one time. About two-fifths of the farm is seeded the first year and one-fifth each succeeding year until the entire rotation is in operation.

Once the five year rotation is in use, the fourth year alfalfa field will be prepared in August each year for the seeding of barley. The same field will be seeded back to mixed alfalfa about the first of August a year later. The grass mixture of this rotation can be used for either pasture or hay. It will be better for hay the first two years and better for pasture the last two, but can be interchanged in emergency. The first cutting of alfalfa should be put up for silage and later cuttings for hay. This is suggested because it is a difficult matter to make alfalfa hay in the early spring. Legume silage can be put up no matter what the weather may be, even in a light rain. As the ensiled hay settles down the silo is refilled by easy stages, a few loads at a time during the summer until it reaches capacity.

In order to prevent bloat, rye should be seeded with a wheat drill in early September in all fields to be pastured the next year.

(Continued on page 124)

THIS CHART SHOWS THE ILLINOIS DAIRY FARMER'S FEED AND PASTURE BALANCE ON HIS OLD ROTATION CONTRASTED WITH HIS NEW GRASS PROGRAM

FEED BALANCE

(Before 1948 on 4-year rotation)

	Bu. Corn Eq.	Tons Hay	Tons Bedding	Lbs. Protein Supplement
Feed Produced	2061	48.0	25.0	
Feed Required	381	33.5	6.3	4050
Balance	+1680	+14.5	+18.7	—4050

Note the surplus corn.
Corn should never have been sold from this farm.

FEED REQUIRED

(On grass program, 1948 to 1952)

Kind of Livestock	No. Head	Bu. Corn	Bu. Oats	Bu. Corn Eq.	Tons Hay	Tons Bedding	Lbs. Protein Supp.
Dairy Cows	24	480	432	696	72	12	9600
2 Yr. Olds	8	80	120	140	12	2	800
Yearlings	8	56	104	108	4	1.6	400
Calves	12	36	96	84	6	.6	
Totals		652	752	1028	94	16.2	10800

The equivalent of 65 tons of hay should be put up as silage. This is the first cutting.

FEED BALANCE

(On grass program, 1948 to 1952)

	Bu. Barley		Bu. Corn Eq.	Tons Hay	Tons Bedding	Lbs. Protein Supplement
Feed Produced	600	—→	540	95	20.0	
Feed Required			1028	94	16.2	10860
Balance			—488	+1	+3.8	—10860

The 600 bu. of barley is figured at its corn equivalent: 9/10 bu. of corn feed value.

PASTURE BALANCE ON GRASS PROGRAM, 1948-1952

(In cow days per month)

	May	June	July	Aug.	Sept.	Oct.	Nov.
Pasture Produced	1440	1440	1440	1440	450	1170	1170
Pasture Required	1180	1180	1180	1180	1180	1180	1180
Margin of Safety	260	260	260	260	—730	—10	—10
% Margin of Safety	+24	+24	+24	+24	—68	0	0

The deficiency in September can be made up by putting up the May, June, July and August surplus as silage. Barley will furnish some pasture in October and November.

OTIS WALL of Advance, Indiana, in one of his pastures on October 10. There had been no rain for four weeks. Still the ladino and alfalfa stood eight inches high, after a season of heavy grazing by hundreds of sheep. The reason this pasture was able to produce like this was that it had been rotation grazed, fertilized and handled as carefully as a cash crop.

LIKE CHILDREN, geese enjoy making tracks in new snow. These Toulouse geese are one of the breeds that have contributed to the farmer's dilemma. Ganders and geese are as alike as fence posts; often the farmer carts off all of his ganders.

THE PILGRIM GOOSE

BY MARIE ARMSTRONG ESSIPOFF

ONLY another goose-in-love knows a "he" from a "she." This little angle has been so highly unprofitable to poultry people and to farmers that this most succulent and noble of birds has a Hooper rating lower than a singing commercial.

No other domestic bird gives such high satisfaction to the epicure. No bird is so delightful to raise and observe, or so responsive to human association. And moreover, no domestic fowl is so intelligent. An old gander is nobody to be trifled with unless you don't mind having hunks of your leg dotted along the garden walk. Geese, like cats, size things up and make sensible decisions and act thereon with aristocratic unconcern for other fowl, animals or humans.

For years enthusiasts have "discovered" geese again and again, started to raise them, and later inadvertently sold off or eaten too many of one sex or another. The Toulouse, the Embden, and fancier varieties with topknots, side whiskers and dickey-bird feathers, all have one baffling trait in common. You cannot tell sexes apart until you catch them in the act of mating or laying an egg.

Even the experts are baffled. If you watch your own flock for some years and get to know each bird personally, then you may be sure of some of them, especially the old mamas that trail "egg bags" on the ground. But even then one gets crossed up at times.

The chance of being left with all ladies or gentlemen has discouraged many a goose keeper. Moreover, the goose usually mates for life and refuses a new mate if the old and beloved one has inadvertently been sent to the market. So, farmers, being busy folk, generally have decided, after a brief flurry with geese, that it was too much trouble to hold over a bunch of husky, half-grown youngsters until the next year merely to be sure they could have properly mated pairs. This is the chief reason why one finds so relatively

few of these easy-to-raise with little expense birds on the average farm.

The Pilgrim Goose is the fairy-tale answer to objections to goose-keeping, for it has the obliging goose-sense to come in two colors; the gander in mature plumage is always pure white with a bright, burning blue eye surrounded by a yellow ring, with yellow beak and shanks and feet. His wife achieves a dress of exquisite Quaker gray with some white around the face and sometimes on the neck.

So never can anyone mistake a goose for a gander and sell or kill off one of a mated pair, which is an offense against goose morals and against one's own pocket.

From the moment of hatching you know what you have in stock. From the eggs come bright-eyed, little balls of either green fluff (like a baby Toulouse), or brilliant yellow fluff (like the Embden). The green fluff grows up into grey females, and the yellow into white males. Pair them off . . . sell off your extras or eat them. Your flock will always be perfectly balanced and you will not be breaking up any happy homes. You will never have to carry over unwanted birds until they are mature enough to act their sex.

But for the interest of one man, there would not be a single Pilgrim goose alive today. The breed was so nearly lost that it took over ten years for it to be hunted down; in ones and twos and occasionally threes, it was brought together again, and properly protected.

Paul Ives, of New Haven, Connecticut, is one of the top flight poultry and waterfowl men in the world. He is a famous poultry judge and the editor of a bright, little paper called, CACKLE AND CROW, which is directed at farmers that like to have something besides an egg and a hen. Mr. Ives, a shortish, dryly humorous and intensely sensitive man, has performed several fine services by digging out old breeds and showing their continued usefulness after they have been pushed into the background for newer, showier kinds.

He remembered seeing, when a child, a few flocks of geese around New England that were different from any seen today. These were flocks of grey geese and white geese, but smaller, with quicker movements, with longer necks and with more grace than Toulouse or Embden. He talked with older men and women who vividly recalled that once the fields of New England were rich with these flocks, and that the smaller birds were gradually discarded in favor of the much larger commercial breeds.

Listening to farmers complain of the uncertainty of goose keeping, Mr. Ives realized that these "lost" birds were, in fact, the only-sex linked goose in the world.

So, he began his labor of resolutely hunting down survivors of the vanished flocks. He found a pair here and there, hidden away on remote farms, and even a few in the Northwest. These he brought together and over many years he mated, discarding those that did not breed true and carry on the sex-link feature, until at last he had a large enough flock so that he could sell a few pairs and trios to interested breeders who had been watching his work with excited and rather greedy eyes.

The history of the Pilgrim, (a name arbitrarily bestowed upon it by Mr. Ives and one obviously right) has been as strange as their original appearance and disappearance. Unquestionably they were brought to this country by the earliest settlers, even perhaps on the Mayflower, since mention is made of livestock and fowl on that over-crowded craft. But from what country in Europe they originally came no one knows, since the breed is even rarer there than it is here. For a time it was the only goose raised in New England. The Toulouse and the Embden crowded them out and into the far corners, and there they would have died off but for Mr. Ives who recalled first, their beauty, and secondly their practicality.

A feature that endears them to butchers and housewives of today is that very fact of their smaller size. They fit into the shrinking ovens of the modern kitchenette, for they weigh 12 to 18 pounds, as against 20 to 30 of the commercial and better known breeds. In addition they are not as fat.

Geese are the best grazers of all fowl and can pick up most of their living from good pastures and the bugs that are present. Like other farm grazers they should be rotated on pasture. During the winter in climates where pasture is not available they need both roughage and grain. The roughage should be alfalfa or clover, hay, vegetables, corn stover, or silage. If silage is fed, be sure it is not heavily molded and does not contain too much corn. Oats is a good grain for geese, especially if it is crushed. Small amounts of barley, corn, and wheat can also be fed. In winter grain should be fed sparingly or the flock will become too fat to breed properly. As the breeding season approaches (March and April in most climates) a mash should be added to the diet, and fed with the roughage. It is made of three parts bran, one part finely ground corn, and one-fourth part meat scrap. This should be mixed with warm water and fed in the morning.

Geese require lots of water; it should be kept in a fountain of a size small enough so they cannot get their feet in it. Next best to a plump June bug, a goose likes wet feet.

The ideal situation is to have the goslings hatch out about the time the pasture is ready. Feeding the hot mash will speed up the breeding season. The incubation period for geese varies from 30 to 35 days, depending on the breed; the eggs of large breeds take longer.

If goose eggs are set under a hen, she can cover from three to seven eggs, depending on her side. A goose will take care

(Continued on page 142)

TWO YOUNG PILGRIM GEESE, a breed only recently rediscovered. The gander, left, is pure white, while the goose, right, is marked with blue-grey. The old goose in the center, mother of the young ones, is interested only in fundamentals, like corn.

THE MUZZLE of a cow should be broad, and well covered with dew, for there are concentrated most of her sweat glands.

THE INSIDE OF A COW

ONLY three or four per cent of the milk cows in the United States are tested and records kept of their milk and fat production. When a farmer buys a cow from this group he knows if the price tag is based on producing ability; if he buys an animal from the 96 per cent group he enters a guessing game, a game based on a set of rules for judging dairy cows he has found will give him only a vague idea of how the cow will pay out at the milk pail.

"The inside of a cow," William Demster Hoard once said, "is the darkest place in the world." Mr. Hoard said that a good many years ago, but the picture hasn't changed much today. For generations the mystery of a cow's giblets that makes one cow give more milk than others has puzzled cattle breeders. They selected their best animals, bred them, and took the results apart in an effort to discover the clue to high milk production.

Some breeders had better luck than others. Their animals looked better and gave more milk. They speculated why this was so, and observed that the high producers had certain points in common which seemed to indicate a relationship between conformation and production. These points were imitated by other breeders and competition developed. They began to bring their prize animals together for comparison by disinterested judges, and cattle shows were born. Scales of points and score cards were put out by agricultural societies and breed associations, standards were refined and re-refined, and then abandoned as new theories were advanced. The original goal of breeding—to discover the relationship between milk production and body conformation — was pushed down on the score card. To some judges the width between the eyes and the set of the ears and other breed idiosyncrasies became important in the prize ring. Today the Associations are awake to the dangers of

this kind of judging. In the "Holstein Handbook" is this paragraph, "A word of warning: without good production, good type is an empty accomplishment. In the past some breeders have centered their attention on type so exclusively that they have awakened to realize that their animals are at an economic disadvantage at the pail."

The association shows, the classes in cattle judging, and the prize rings at expositions and fairs offer a good show to the farmer who wants to buy a cow, but they don't help him much with his problem of getting his money's worth in a cow trade. In spite of the claims of some experts that the score card is a simple, easy and sure guide to a cow's inside, the shrewd old farmer still insists he would druther see her production record if he had his druthers. If he is a cow fancier, and has the commendable desire to own blue ribbons, the prize ring has a useful place in his life, and a thorough knowledge of points and score cards is to his benefit.

The U. S. D. A. Approach

The people at the government stations don't accept prize ring standards as the only base for buying a cow—they giveth and they taketh away in this paragraph in the 1947 Year Book of the U. S. D. A.

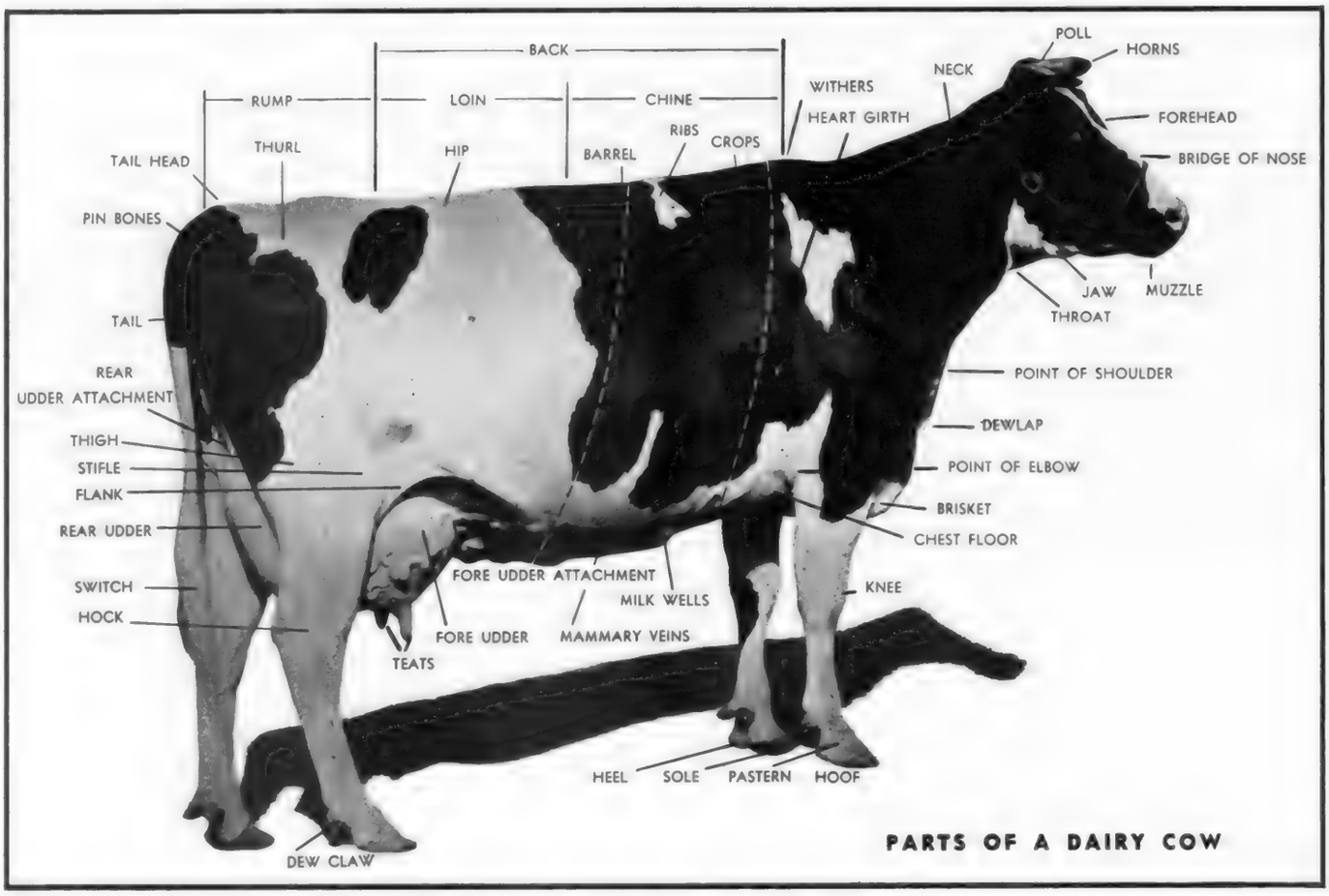
"Undoubtedly all these activities do much good. They stimulate thought, bring exchanges of ideas, create a more uniform ideal of dairy cattle type, and establish goals for less experienced dairy farmers. But the fact remains that many details commonly considered important pertained largely to the beauty of the animals. Logical explanations are given for desiring certain body characteristics, yet there is little scientific information to support some of them. Besides, little credit has been given to the two vital points, the recorded ability of cows to give milk and butterfat and the proved ability of sires to transmit high production to their daughters."

As a more realistic and more utilitarian approach to the problem of judging cows from the standpoint of production, the U. S. D. A. has designed a combination production-conformation test which recognizes both type and test record in selecting an animal either for the dairy or the show ring. The plan, in the academic phrasing of the Department, "covers the judging of cows on the basis of combined ratings for type and production performance; for judging sires on the basis of the type-production rating of their daughters; for judging cows by groups; and for conducting judging contests in which the combined-rating system is used. It obviously cannot be applied to heifers or bulls that do not have daughters with records of production. Under the system, a class of cows is first judged on the basis of type and lined up in the usual manner. Each cow is assigned a numerical rating for type; this represents her relative position in the line. She is also given a numerical rating that represents the relative position of her production among the cows in the class. The two ratings are combined, and the cows are realigned according to their combined ratings for type and production.

Further explaining the plan the U. S. D. A. points out, "the procedure differs from the so-called production shows, in various parts of the United States, in which a minimum production record is usually required for every cow entered for competition on the basis of type. Such a requirement serves only to limit competition to cows with moderate milking records. It gives no consideration to differences in production—a cow with a record of 1000 pounds butterfat in a year receives no more credit than one that barely meets the requirements for entry.

"Although the plan was developed primarily for judging individual cows, it has been adapted to the Danish system, which consists simply of placing the cows in groups representing well-defined degrees of excellence in type. Cows meeting established standards for any particular group are placed in that group, and all cows in the group receive identical awards. Thus, one need not split hairs over minor points for cows of similar type, and one

A COW JUDGE will look for three pronounced wedges in a good milking cow. A bird's eye view shows one wedge with its base at the hips and its apex at the withers. Front and side views of the animal show two other wedges. This arrangement of angles, thrown together by nature and accentuated by selective breeding, is more functional than beautiful. At the expense of symmetry these are mostly located aft near the cow's milk factory. A cow in good milking condition is on the lean side but she may fleshen up while she is carrying a calf.



PARTS OF A DAIRY COW

THIS IS A PRIZE COW and she would rate high on any judge's score card. Note particularly the udder attachment, its length forward, the fine back, and the depth of the barrel.

NO TWO SCORECARDS agree. This is a composite of a large number used by the associations and show ring judges. There is approximate agreement on the relative importance of the six major divisions. All give mammary development about one-third the total.

THE SCORE CARD	Standard	Score
HEAD—8 per cent.		
1. **Muzzle,** broad	1	
2. **Jaw,** strong, firmly joined	1	
3. **Face,** medium length, clean	1	
4. **Forehead,** broad between eyes, dishing	1	
5. **Eyes,** large, full, mild, bright	2	
6. **Ears,** medium size, fine texture; secretions oily and abundant, yellow color	2	
FOREQUARTERS—10 per cent.		
7. **Throat,** clean	1	
8. **Neck,** long, spare, smoothly joined to shoulders, free from dewlap	2	
9. **Withers,** narrow, sharp	3	
10. **Shoulders,** sloping, smooth; brisket light	3	
11. **Fore legs,** straight, clean, well set under body	1	
BODY—25 per cent.		
12. **Crops,** free from fleshiness	1	
13. **Chest,** deep, roomy; floor broad	6	
14. **Back,** straight, strong; vertebrae open	3	
15. **Ribs,** long, deep, sprung, wide apart	3	
16. **Barrel,** deep, long, capacious	10	
17. **Loin,** broad, strong	2	
HINDQUARTERS—12 per cent.		
18. **Hips,** prominent, wide apart	1	
19. **Rump,** long, level, not sloping	4	
20. **Pin Bones,** wide, apart	1	
21. **Tail,** neatly set on, long, tapering	1	
22. **Thighs,** spare not fleshy	3	
23. **Hind legs,** well apart, giving ample room for udder	2	
MAMMARY DEVELOPMENT—30 per cent.		
24. **Udder,** large, very flexible, attached high behind, carrying well forward; quarters even, not cut up	15	
25. **Teats,** wide apart, uniformly placed, convenient size	5	
26. **Milk veins,** large, tortuous, extending well forward	4	
27. **Milk wells,** large	6	
GENERAL APPEARANCE—15 per cent.		
28. **Disposition,** quiet, gentle	2	
29. **Health,** thrifty, vigorous	3	
30. **Quality,** free from coarseness throughout; skin soft, pliable; secretions abundant; hair fine	4	
31. **Temperament,** inherent tendency to dairy performance	4	
Total	100	

"Herd sires are rated on the basis of the type and performance of their daughters. Each sire's daughters are treated as a group. Each group is judged for type and given ratings for it, for butterfat production, for increase or decrease in butterfat production as compared with their dams, and for the percentage of the daughters that are better than their respective dams in butterfat yield. The sires themselves are not rated on the basis of their own type, consequently they need not be exhibited—a costly and sometimes dangerous practice for valuable, old, and heavy animals. The method is essentially similar to the procedure followed in the selection of a herd sire. Our plan worked out with the current conceptions of type unaltered, although we believe numerous ideas of type are based largely on suppositions that may have little scientific support."

The U. S. D. A. system, while it results in a closer approximation of performance than the score card of the prize ring, does not settle all the problems in choosing a cow or bull, especially in everyday farming operations. The best solution, until the professors find the way to illuminate the darkness of the inside of a cow, is to buy and handle milk cows on the basis of their ability to produce. There is an active movement on foot to increase the percentage of tested cows in this country, but it will be many years before the tested group reaches even ten per cent of the total.

What this country needs, in addition to a good five cent cigar and sensible millinery, is a uniform standard by which to measure the production of a cow. While a farmer would rather see the record of a cow than the cow herself, the records themselves can be very confusing. Some dairymen and some associations figure the record on the basis of a 305 day lactation period, others on a year, or 365 day period.

There seems to a trend toward stating all records in terms of "305 days, 2X, Mature," and it will be a happy day when all the breeds adopt a basic plan and develop the necessary factors for standardizing records to this basis. Only when the records have been standardized can they reveal their full meaning. Actually the job of standardizing records is not a difficult one and entails only a bit of arithmetic. It is so obviously unfair to compare two-year-old records with, say, six or ten-year-old records, that it is hoped a general standardization plan will soon be in use by all the breed associations.

If the associations would adopt a uniform rule, or would authorize the government to set up a standard for testing, buying a cow would be a great deal simpler than it is today. There is a general belief, well founded, that a cow that rates high in show points lives longer and produces more than her less showy sister.

It is therefore necessary for the farmer who, in the absence of records, wishes to (1) breed a cow, (2) buy a cow, or (3) sell a cow, to familiarize himself with the current methods of judging an animal's quality by its appearance, body form, and physical characteristics.

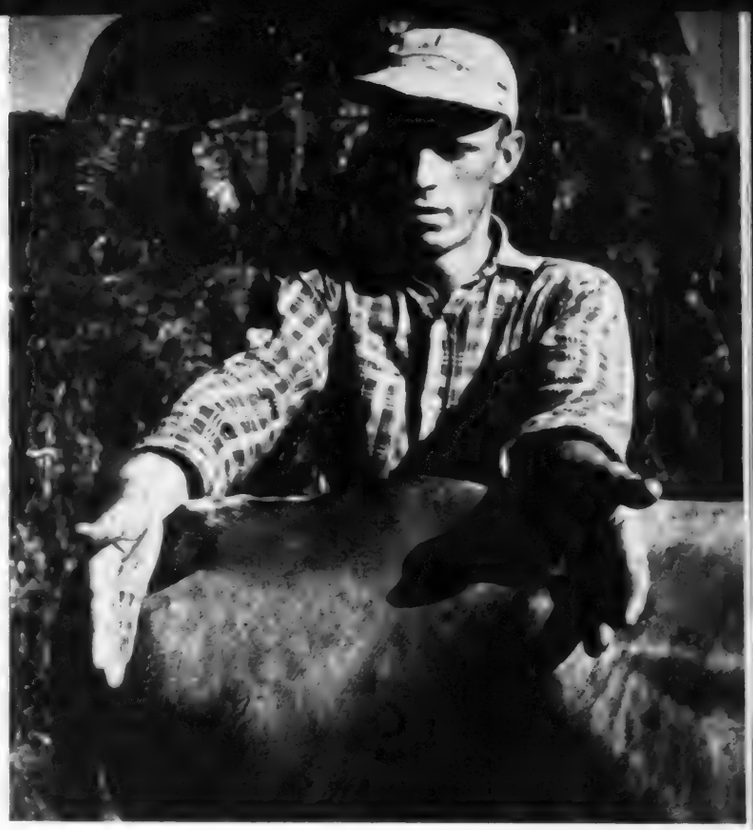
Very few dairymen care whether a cow has a spot on her rump or her brisket just as long as she gives a lot of milk with a high fat content. She may be built like a camel or be bob-tailed and she will find bed and board and love in the farmer's stable if she fills the milk pail.

Of course, smart farmers and dairymen know that there is a relationship between the conformation of a cow and her ability to produce. After all, you can't get a gallon of water into a quart jug, and a cow with a pint-sized udder won't break records. By and large, conformation points are not positive guide posts to high producing cows. The figures on the score card might be called, in the final analysis merely straws in the wind.

An athlete must have two well-muscled legs, a good pair of lungs, and a good heart and circulation. Yet there are many men with all the visible qualifications of an athlete who can't run fast enough to flag a bread wagon. A cow may have all the physical characteristics of a high producer and yet be scarcely worth the time spent on adjusting the milking machine.

In scoring a dairy cow the judge must decide (1) is the cow to be judged for the prize ring, or (2) is she to be judged as a possible milk producer. If the former, the judge must be letter-perfect in the standards of the breed. These are strict and are interesting and important on the blue ribbon circuit. However, we are assuming that more important to John Doe, farmer, is his ability to judge a cow for her milk production.

There is a certain type or form of bovine architecture that is associated with high milk production. This chassis has been acquired by the milk cow. Before cattle were domesticated, it is likely that cows gave only enough milk to bring their calves up to the grass-eating stage. For hundreds of years breeders have been accentuating the physical characteristics which were thought to be associated with high milk production. Whether the form of the dairy cow is the result of her function or her function is the result of her form, is an egg-or-chicken question yet unsolved. The modern form of a cow permits the greatest development of the organs important to milk prodction. She must have strong jaws to clip grass, a big mouth to chew it, a set of big stomachs to digest it, and a large circulatory system to carry the blood (from which the milk is made) to her udder. The lactation period has much to do with the proper condition of flesh of a dairy cow. During her dry period her body should build up to withstand the wear and tear of a long milking period. Shortly after freshening a dairy cow loses much flesh which gives evidence that her feed goes into the milk bucket rather than on her back.



A LEVEL RUMP indicates that the udder has ample room. Some good cows have sloping rumps, but they won't take prizes.

A PENDULOUS UDDER is easily injured and an easy prey to mastitis. The quality and quantity of milk are not affected.

THE SHOW RING JUDGE and the farmer looking for a good milker both know the importance of "milk veins." They do not carry milk, but their size indicates the amount of blood passing through the udder. They should be long, large, and tortuous.

Her coat will be smooth and soft; her eyes will be bright and prominent and wide awake showing that her thinness is not the result of poor health but due to her inherent tendency to convert feed into milk instead of flesh. Viewed objectively the dairy cow is not beautiful—her general angularity gives her a wedge-like conformation. Cow men look for the three wedges in a cow.

The first viewed from the side, the base of the first wedge is formed by the depth from the hips to the lower extremity of the udder, the apex or point of the wedge at or in front of the head.

The second wedge can be recognized by taking a bird's eye view of the cow. The base is formed by the width across from one hip point to the other, with the apex at the withers.

To identify the third wedge, stand in front of the cow and imagine a line drawn between the outside points of the shoulders, with the apex located at the withers.

The more pronounced the wedges, the more nearly the cow conforms to "dairy type."

Now that the cow has been identified as a dairy cow instead of a beef cow, the next step is to go over her point by point. It's a very good idea to have a system in doing this, memory being what it is, and to use a score card to check off each point and evaluate it. The score card presented in these pages is typical. There are others just as good but all may vary slightly in evaluating the importance of various points. To fill out this score card we start at the nose of the animal.

HEAD—8 PER CENT—Put your hand under the chin of the cow, raise her head an examine her muzzle. A broad muzzle means a good feeder; a pinched muzzle indicates lack of constitution and capacity. Run the hand along on the underside of the jaw, from the mouth to the throat. The jaw should be strong of bone and muscle and attachment to the upper jaw to indicate a powerful chewer. The face from the muzzle to the forehead should be medium length and clear cut and devoid of bumps. The forehead should be broad and slightly dished. The eyes should be large full, mild and quiet, indicating placidity. A drowsy eye is associated with low milk production for reasons unknown. The ears should be of medium size and fine in texture.

FOREQUARTERS—10 PER CENT—Grasp the throat in the hand. It should be clean-cut and thin. If it is thick and beefy, it shows lack of dairy character. The neck should be long, spare, and smoothly joined to the shoulders in direct contrast with the short, thick neck of the beef animal. The longer and more folded is the dewlap, the less desirable it is.

Now, place the hand on the withers. By eye and hand, work down the neck, withers, and back from above to gain an idea of the conformation of this region. The top of the shoulders and spinal column should fit together to form sharp withers. Cows with coarse or open withers, wider across than the hand indicates beefiness or coarseness.

Now step back two paces to one side of the cow on a line with her head and take a gander at her shoulders and fore legs. The shoulders should be sloping to indicate capacity of chest and smooth to show quality and trimness. The brisket should be neat and fine and not beefy. The fore legs should be set directly under each front corner of the cow, far enough apart to give chest capacity. They should be straight and trim. If they are set too

close together, the heart and lungs haven't sufficient operating space.

BODY—25 PER CENT—Pass the hand along the spinal column, immediately back of the withers. Here is located the chine-bone. It should be clean and not fleshy. Here is one of the first places a cow puts on fat which makes it full and rounding. Pass the arm over the cow's body just back of the fore legs. If you have a good armful and can reach only a short distance up the other side of the cow's chest, she is all right in that department. The chest should be broad and deep, indicating good heart and lungs. The back should be straight and strong and when you run your fingers down the top of her spinal column, the separating processes should be distint. If the sections of the spinal column are closely joined, it indicates that the nerves that pass out between them are pinched and small. A great many good cows have defective backs. That is, backs that are not straight. This doesn't seem to affect their milk production but is penalized in the show ring.

Follow the ribs from the spinal column to the lower extremity, noting length, spring, and the width between the last two or three ribs. The spring of the rib means the angle at which it leaves the spinal column. The more horizontal the rib is, the wider and deeper will be the body cavity enclosed by it. The last two or three ribs should be far enough apart is of great importance, and should give an impression of being deep, long, and wide, indicating that the cow has ample resources for feed because the more feed she gets inside her, the more milk is her potential. The loin should be strong and broad because it supports the abdomen and reproductive organs.

HINDQUARTERS—12 PER CENT—Standing at the rear elevation of the cow, note the width between the hips. The hips should be wide apart and prominent necessary for a capacious barrel and ample room in the pelvic region. From the side opposite the hindquarters, note the area between the hip joint and pin bone which is known as the rump. It should be long and level. The length is important as it is directly related with the space for the attachment of the udder. If the rump is sloping, it detracts from the symmetry of the region. In production, however, it seems to mean very little. One of the very greatest families of Guernseys has determinedly sloping rumps. The pin bones should be wide apart to indicate easy calving. Note the length and quality of the tail and the tail setting which should be level and neat, the tail dropping down squarely from the body. The tail should be long and tapering and of good quality, and for show purposes, it should reach the hock. There is no reason why a bob-tailed cow should not give as much milk as a cow with a perfect tail. While it handicaps Bossy in dealing with flies, it makes the milker much happier to have no tail to get in his eyes. A high, sloping tail setting is not desired. Note the thighs, both from the side and rear. Viewed from the side, they should be thin and incurving, wide apart and this width should be carried well up to permit development of the udder and milk capacity. The hind legs should be set wide apart and be trim. A common defect with the hind legs is a bow inward at the hocks which limits the space for the udder.

MAMMARY DEVELOPMENT—30 PER CENT—For all practical purposes a cow is a piece of milk producing mechanism built around an udder. All good producers have well-developed udders and certain characteristics are common to high production. Stand to the side and rear of the cow. Note the quality, shape, and attachment and size of the udder. It should be long from

(Continued on page 111)

SCORE THIS SAD COW and the one pictured above the chart (page 78) and compare the scores. This animal has one redeeming feature; she would make very good bologna.

WINTER ON THE FARM

BY HAYDN S. PEARSON

THERE are sophisticated urbanites who think farmers spend the winter months before the kitchen stove toasting their woolen-socked feet in the good heat of dry birch and maple. O yes, there are a few chores to do, but the general opinion is that a man takes his ease and gets caught up on the farm journals and Old Farmer's Almanac. There are others, including a good many men behind dignified desks, who know that winter on the farm is a time of work, as well as rest. There are still thousands of farms where the pattern is about the same as it was a generation ago when breakfast was a meal and a man carefully chose new horse blankets from names such as Redbird Fancy, Hudson Plaid, Mount Royal, Improved Apache, Cherokee Prince, Jersey Lily, Blackhawk, Great Eastern Fawn and Lulu Fancy Striped.

Thawing out the pump was a regular job in cold spells. Only occasionally did the kitchen pump catch. The kitchen range was stuffed with chunks of dry wood and the drafts closed at nine o'clock when the family went to bed. But the barnyard pump was a different story. Nothing can be more ornery and cantankerous on a 10 below winter morning than an outdoor pump. Mother always heated kettles of water and slowly poured the boiling liquid down the pump, working the handle up and down, desperately hoping to hear that coughing gurgle that meant the water was coming. If a fellow had to pump a trough full of water for a string of cows and young stock, for the horses and perhaps a few steers before he went to school, he knew the value of water in farming.

Ice cutting time was not so bad. There was nothing particularly thrilling about sawing out the gray-green cakes and pushing them through a black, crackling water channel to shore, but the village pond was a scene of activity with a score of farmers and their boys getting out the ice. In a boy's opinion any job was improved if it meant handling the lines over a pair of chunky, high-lifed Morgans. On a sparkling winter's day when the snow tossed back jewel glints to the low-circling sun and the snow crunched and squeaked under the steel runners of the sled, it was fun to let the team trot down the slopes. Layer by layer the old, sagging-roofed, weather-grayed ice house was filled. A little sawdust was scattered between each of the layers. This meant the cakes would come out easier in the summer to keep the milk trough cool; meant too, on a hot summer day a fellow could get a piece quickly when Father said along about three on a sticky afternoon, "Son, I'll finish cocking the hay. Why don't you go up and see if Mother will mix us a mess of ice cream for supper. A dish of ice cream with crushed raspberries will sort of hit the spot tonight." Last of all, the sawdust was shovelled around the solid mass of ice and a deep layer put over the top.

One of the big jobs before the days of oil and electricity was getting out the stove wood. Chopping wood is good work, compared with cleaning out calf pens and hauling manure. There's something about the woods in winter. A man has an affection for his favorite axe, an axe with just the right heft and balance and a razor-sharp edge. Gray day or bright, the mood of the woodland does something to a man. Chickadees come around and

Man, and his land and animals rest during the long winter, gathering themselves for the spring with its planting and growing. These are old fields, farmed through generations, open to the ravages of the elements. Yet nature has a way of protecting her own; the snow gathers in the furrows, a cloak against the wind. The roots of the corn hold the soil in place and the stalks will go back to feed other crops to come.

chant their altoish refrains; woodpeckers put on their acrobatic stunts; a partridge may go up with a sudden loud drumming. Shep, the collie, pokes around the brush and gives frantic chase to a rabbit that doesn't act too perturbed.

There's a nostril-tingling fragrance as the big chips with feathered edges fly through the air and make a tan and gold pattern on the whiteness. No particular sense of urgency on a winter's day. A man keeps going, but there's time to study the bark patterns, time to listen to the soft talk in the evergreen branches. Perhaps you want to get out some timber for building or repairing: boards, shingles and dimension stuff. Then the crosscut saw is filed and you pull rhythmically back and forth, back and forth, as little geysers of sawdust make piles on the ground. There's an art to crosscut sawing; pull, not push, is the rule. Men far from the farm remember with a smile how the family hired man would always bring in the old crack: "Don't mind your riding the saw, but don't let your feet drag."

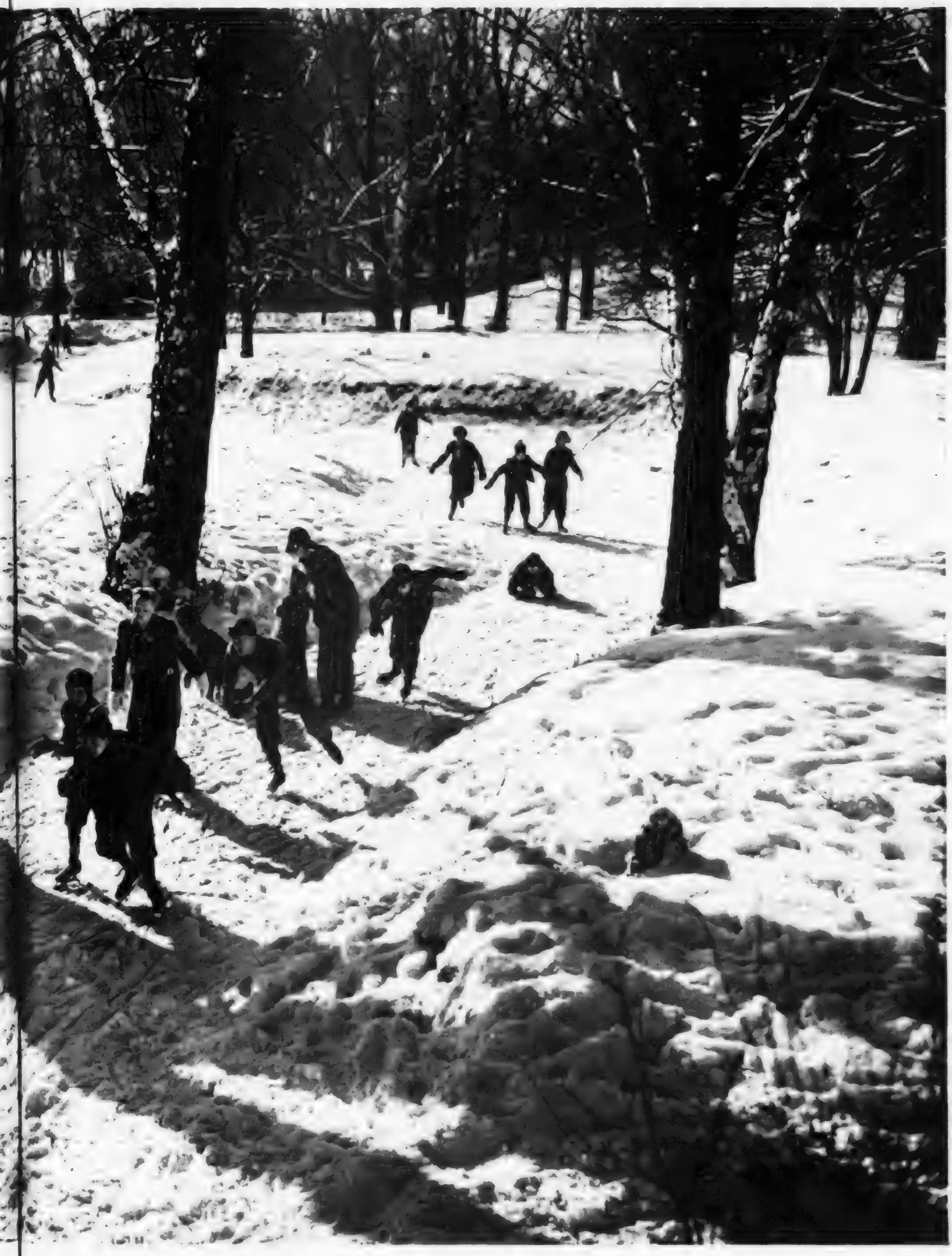
It was good work to haul the logs to the old sawmill on Johnson's Creek. During the winter the sloping yard was gradually filled with piles of hardwood logs, hemlock and white pine. Each pile belonged to a farmer—and every log had on its butt end the purpose for which it was intended: boards, shingles or dimension. Come spring and high water, Mr. Johnson would saw out the logs and farmers would take the lumber home and stack it to dry.

On stormy days when snow was falling or sleet was playing tick-tack against the windows, it was good to putter around in the farm shop. The rusty stove brought the place to a comfortable 80 degrees. A farm shop has always been the farmer's sanctuary in a harried world. The windows are thick with grime and dust; old cobwebs make tangled spots in the corners. The bench is a hodge-podge of stuff: lumber, pots and pails, cans of bolts and old nails and rusty screws. The corners are stacked with crowbars, shovels, nail kegs, and broken tools. Half-used buckets of creosote and bags of fertilizer add to the heavy, familiar pungent smell. The floor is thick with accumulated dust, shavings and plain dirt. From spikes in the partition two-by-fours hang old horse collars, blankets, bags, baskets and pieces of harness. A pleasant part of winter on the farm is the time in the shop, mending broken tools, oiling the harness, or whittling out new teeth for the bullrake.

Before the days of trucks and tractors, a big snow storm meant work on the roads. Two or three farmers hitched their teams to a big roller and rolled down the snow, or shoved it aside with a home-made snow plow. Young men of a dozen or fourteen years were always glad to see big storms. It meant not only a vacation from lessons in the district school, but a chance to earn a little money. A dollar a day was big money and a fellow never had quite enough capital when it came mail order time in the spring. Each section of road had places famous for its deep drifts and boys shovelled out the deep spots so the horses could get through. Never seemed just right, somehow, that a fellow who shoveled got a dollar and the men who had the horses got two dollars for driving—or just going along. But it was a good lesson. Spurred a lad on in his dreaming. Someday he'd have a farm, a good team, and he could get the rewards of industry and experience.

There was pleasure as well as work. Sleigh rides to neighboring towns on crisp star-lit nights were good fun. Came times of hard crusts and one could have long slides down the sidehill slopes. Wonder how many of us have sat on a big steel corn scoop shovel and gone turning, twisting and whirling down a steep grade on an icy crust? There were skating parties on ponds and rivers. The lyceum course in the town hall brought Swiss Bell Ringers, a troupe of trained dogs, the Southland Quartet, a magician and the make-up artist who did his work right on the

ALL WINTER LONG the kids waited for the creek back of the school house to freeze over. The freeze came, late in December. It snowed too, covering the ice and the stones and air pockets that caught your skates and sent you sprawling. When school was out there was a rush for the creek. Chores were late that evening, and most everybody nursed a bruise or a skinned knee, but it was fun.



ANIMALS KNOW what is best for them. When the sun comes out on winter days they want out of the barn. The shed protects the water pump and helps keep the water from freezing over in the trough. Plenty of water between feedings will keep them happy.

stage—and you saw Abe Lincoln, George Washington and Uncle Tom come to life before your eyes. On Sunday afternoons when the neighbors and friends gathered, Mother played the organ and the old songs stitched meanings into human hearts. There were grange suppers, church sociables, spelling bees and debates. Those debates were amazing and provoking. In a little New Hampshire town it was decided one winter's night in 1910 that automobiles would never amount to much. It was a locally famous debate. Mr. Whittaker, the village banker, argued for horseless carriages. He predicted that some day horseless carriages would become common. He even said we could expect airplanes that would fly across the oceans. Folks smiled tolerantly. They applauded generously. But when Deacon Davis, a good solid farmer and breeder of Morgans, began his speech it was easy to see where sympathies lay. His speech rattled the rafters and tugged at the heart. He wound up in a blaze of glory and deafening applause. "How can autos ever become popular?" he orated. "Maybe the stinking, noisy contraptions will be play things for rich men's sons! But everyone has horses, and if people bought autos, what would become of our horses?"

It was on winter evenings that life on the farm reached the full measure of comfort and contentment. After chores were done and the supper dishes washed, the family gathered in the living-room. Father pored over the seed catalogues or leafed through the mail order book, his thoughts on the spring and the planting; Mother sat with her basket of mending, one eye on the twelve-year-old who preferred the alluring pages of Nick Carter to the arithmetic lesson. The dog and cat lay together behind the big base burner, their daytime feud suspended.

There was adventure when bedtime came and Father lit the oil lantern and put on his gloves and his old coonskin cap. "Come on, son," he'd say, "let's put the stock to bed." You followed him out into the star-lit night, the lantern throwing grotesque shadows across the snow. Inside the stable were the warm, living smells of the animals and the musty tang of hay and manure. The team had bedded down for the night but the cows were still chewing their cuds, and an old hen, who never could be trained to sleep in the chicken house, jumped off her perch on a manger and cackled resentfully at the disturbance. A pigeon murmured sleepily under the eaves.

"Everything's all snug," said Father. The stable door was closed and there was the winter night again. The snow complained under your feet and the stars were so close that you felt you could reach up and pick them out of the sky. The lamp in the living-room sent a shaft of yellow light across the yard and made a luminous path into the darkness beyond the well shed and the garden.

It was good to be alive then; to know that man and beast were snug and warm, the granary and the pantry full, and the fields, asleep under the winter snows, awaiting the spring.

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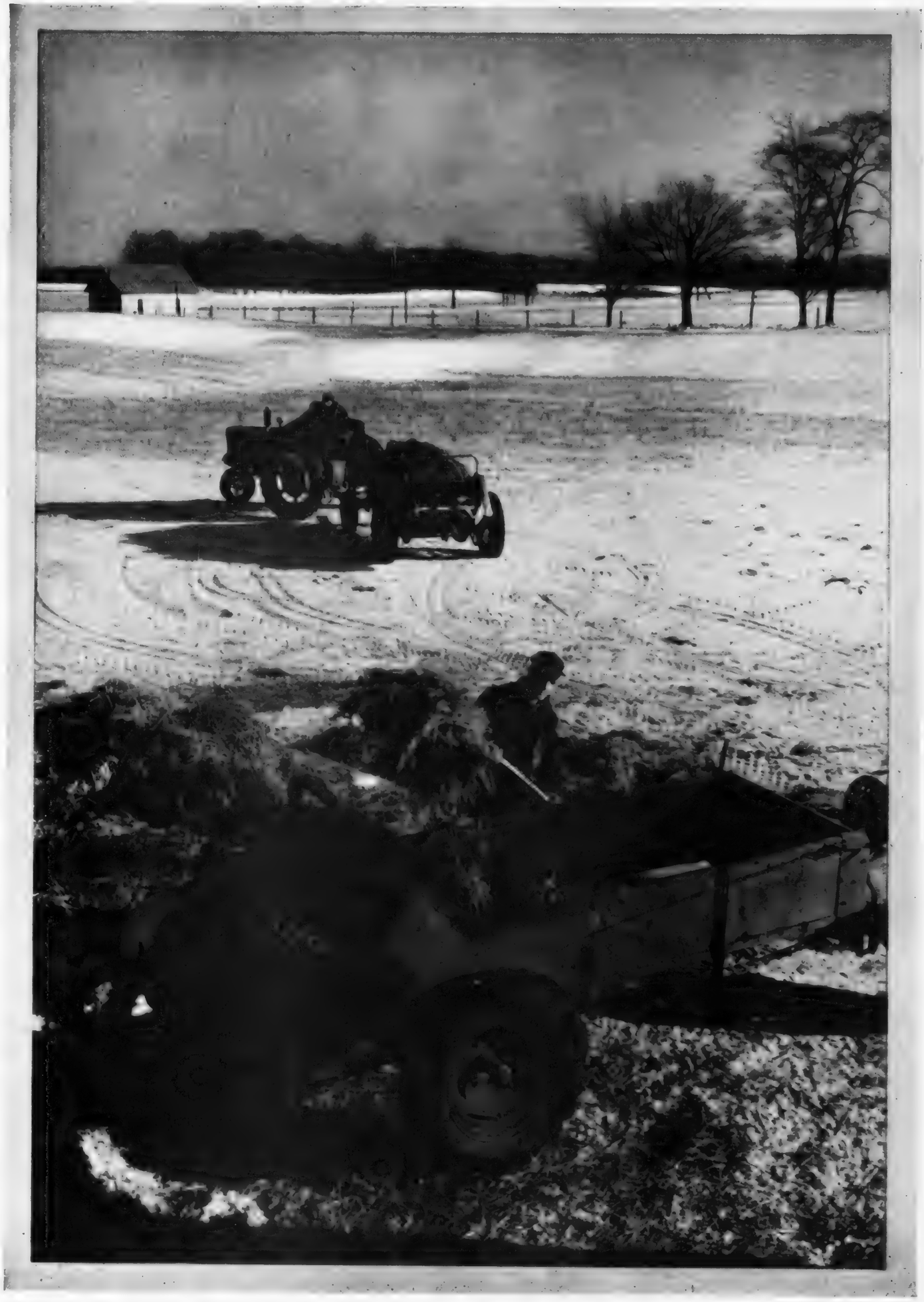
SLACK TIME in winter gives the farmer a chance to manage his manure to save most of its strength — spread on the fields each day as it comes from the stalls.



PRECISION FARMING

"THE hard work of producing big crops has not worn out our soil," said Walter Pretzer as he pointed to land that produces an average per acre of 9,000 eight-pound baskets of tomatoes and 10,000 ten-pound baskets of leaf lettuce a year. "In fact, it is better land now than it was in 1883 when it was acquired. For the last three years our small farm has grossed $135,000."

For the man who has 5 to 25 acres the story of Walter Pretzer and his small acreage of specialty crops is proof that it isn't acres but acumen that makes a farmer. Ruetenik Gardens is the name of the 15½-acre farm that Pretzer and his wife operate near Cleveland, Ohio. Off its 12 outdoor and 3½ under-glass acres 10 families and a year-around average of 6 single men have been able to make a good living for many years. The yearly production of the indoor acreage averages 90 tons per acre a year and the outdoor acres produce about 32 tons each.

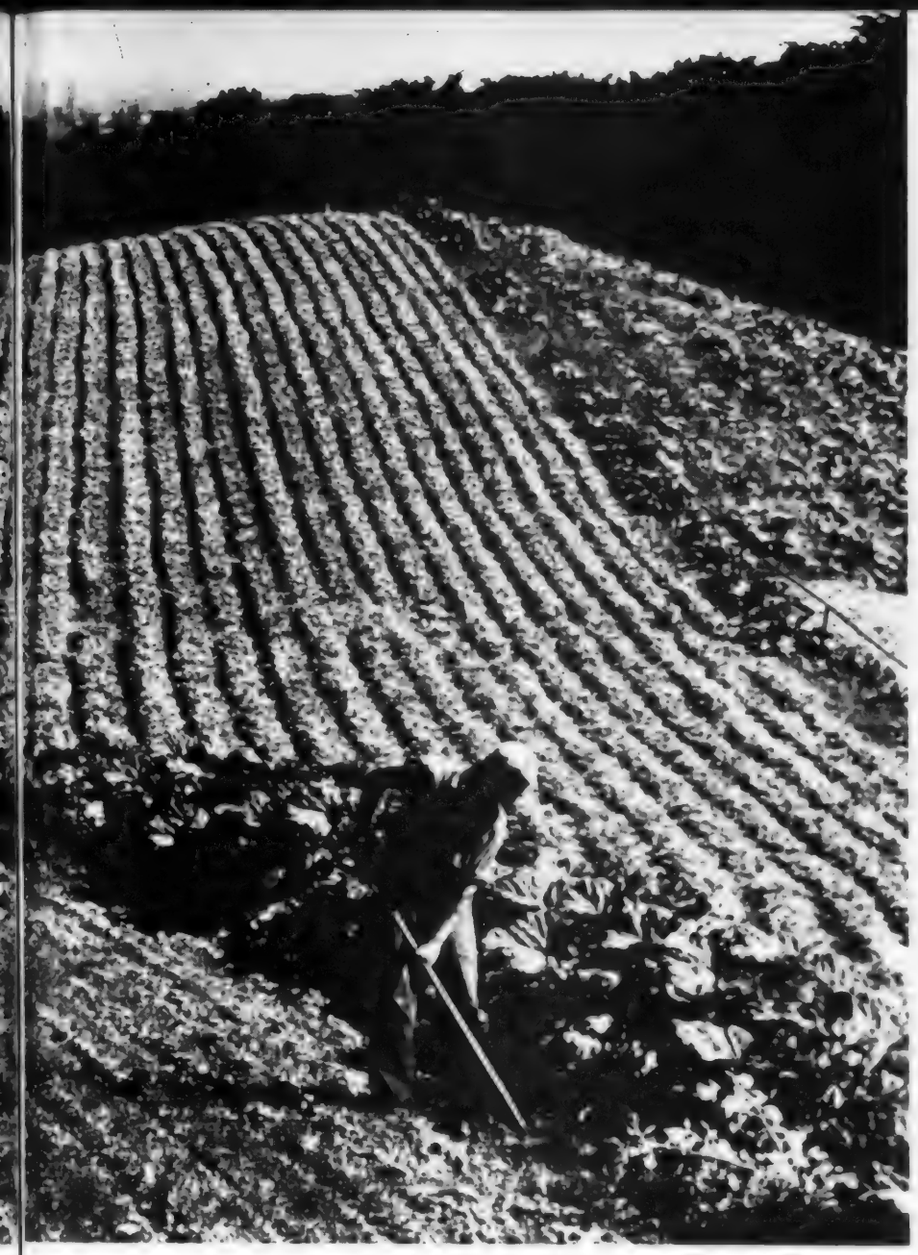
This is precision farming with controlled conditions. There is no attempt to "force" the plants. The idea is to give the crops the best climate and soil for most productive growth.

The weather can be controlled, with the exception of making sunshine during a cloudy spell and keeping the underground temperature up when the outdoor temperature dips to zero for several days. Rain awaits only the turning of a valve. Pollination is not left to bees or nature; a small electric buzzer is used to jiggle the tomato blossoms to insure a "set." A running series of tests are made as the plants grow, to check the soils for mineral content and balance and fertility at the ideal production point for the kind of crops being grown.

Pretzer's seed-planting procedure, mulching, soil testing and fertilizing methods are just as practical on a farm near Cherry Point, Illinois, or Flat Rock, North Carolina.

The farmer with 100 to 200 acres can not expect to duplicate Pretzer's intensive methods, but he can adopt many of his management tricks to increase his yields.

Walter Pretzer believes that the understanding of the soil with which a farmer is to work is the starting point for a man in his efficient use of his own land. Waving his hand at what appears to be the ideal soil of the area in which the Ruetenik Gardens is situated, he says, "This whole area which now supports so many small farms



Walter Pretzer has mixed
Science and Intuition to
make an Acre of Soil
produce 90 tons of food

and greenhouses is a glacial deposit of sand, gravel and clay. It is good soil, but like most other ground, a few years of slipshod handling would make it as stubborn and unproductive as the mules we used to keep for our plowing. Its present fluffy lightness has come from plowing organic matter into it for 60 years. Its fertility comes from a carefully planned program of supplying the right amount of manure, mulch and minerals. I feel that our experience in the continual use of the same soil over long periods of time

TRACE MINERALS are part of the carefully tailored fertilizer mixture that Pretzer fits to the needs of his soils. A basic ingredient is the ash from tobacco stems which are burned in smudge-pots for aphis control.

is a key to what can be done nationally, if we put our heads to the problem of managing soil instead of mining it. For no longer are there great stretches of virgin soil which can be opened up as we wear out the farms already under cultivation. We will have to live with our soil, not abandon it.

"Soils have characters as different as the people we work with," said Pretzer as he crumbled some of the black, friable seed-bed that a tractor was preparing in one of his immense greenhouses. "Some are gaunt and half-starved; others are fat, lazy, and overfed. We like to think of the ideal soil, like a healthy person, as having a well-built frame of good, strong bone, well covered with solid flesh and muscle. The soil's bones are made up of well-distributed minerals, from microscopic particles to stones which may be of walnut size. Like a person's these bones are covered with muscles and flesh which are the top and sub-soil. Together they should be capable of absorbing and holding large quantities of plant food, oxygen, and moisture. When these are in proper balance they can do a long day's work for the farmer. We must recognize that the first sign of plant hunger for any kind of food is the first step toward plant disease."

The Summer Hired Man

The story of Walter Pretzer, like that of many other farmers with ideas, turns on a love of nature and an intuitive understanding of her ways. At the start of this century the farmers on Schaaf Road, on the south side of Cleveland, noticed that about the time strawberries were ready, a boy of six with a permanent smile and cheeks as red as the ripest berries turned up every day. The berries that he picked were as carefully handled as those of the twelve-year-olds. Summer after summer during his boyhood, Pretzer worked for farmers in this neighborhood; it was a short walk from his home near Brookside Park. As he grew older he spent more of his time with these men—they talked about things in which he was interested. They seemed to know the mysteries of making plants grow. Even in years when the farmers a few miles farther out were complaining about the "bad season," these men through skill and foresight were able to bring their crops to maturity. By the time he was ready for high school he had decided he was going to have a "general farm." But he changed his mind after he worked all summer on his cousin's farm for $3.00. This was the vacation before he entered West Technical High School. During his next vacation he picked his own job. M. L. Ruetenik was known as the "best gardener on Schaaf Road"; it was here that Pretzer decided he was going to work, and he did. When he went back to work for Mr. Ruetenik at the end of his sophomore year in high school he felt he was getting some place—for didn't he earn $1.60 a day, just 50 cents less than the men earned? A chance remark by a high school teacher who asked Pretzer to give a demonstration before an agriculture class and presented him as "Mr. Ruetenik's right hand man" fired his imagination, and he began to wonder if he really could hold down such a job.

From that time on Pretzer gradually grew into the thinking that develops management ability. When unseasonal cloudy weather in the spring of 1915 held back the seeds, he started out with a series of planting flats to find the best methods for bringing tomato plants along under adverse conditions. His work resulted in several improvements of technique, one of which was the reduction of the use of 18 ounces of seed to 6 ounces for the entire planting. In addition, the plants were healthier and sturdier. Then his work was interrupted by World War I. When he returned he found himself, a city boy of 23, working along with Mr. Ruetenik, with many of the responsibilities that go with a highly specialized farm. Within a few years he was married to Mr. Ruetenik's daughter and gradually they took over the management of the farm, increasing their investment in it until finally the entire farm was purchased. As Pretzer looks back on his start on the management of the farm he compares it with putting a new driver equipped with modern ideas and tools behind the wheel of a well-used car. He and his wife were launching a new enterprise on soil that had been farmed heavily for forty years. While the farming had been done by the best of the old methods, it had taken strength and vigor out of the soil. They found themselves in a situation not at all unlike that in which many a farmer finds himself today.

Soil Can Be Too Rich

Here was the challenge of taking soil which Mr. Ruetenik said could best be handled by hauling it away, or moving the greenhouses away. Balance was gone and the crops were unprofitable. To the neighbors' surprise they did cart away the top soil from an acre of greenhouse and replace it with earth from the outdoor area. The crop results were the same, which indicated that the soil was out of balance outdoors as well as indoors. Pretzer found out later that the soils were starved for mineral salts necessary to aid in the reduction of organic matter, with which the soil was over-loaded. Like every other farmer in the neighborhood Pretzer was faced with the problem of plant diseases. What caused them? What could be done to get rid of them in the concentrated production areas? If you put on heavy applications of manure and fertilizers why did production decline some years? These were some of the questions that he set out to answer.

THIS OCTOPUS-LIKE contraption is a duster which was built by Pretzer for use on the celery and other row crops. It is powered by a small gasoline engine which drives a sifter and blower. The whole attachment has a three minute off-and-on time on a Ford hydraulic lift.

PRETZER runs soil tests on his greenhouse soil at least once a week in the spring and summer months. He believes that every farmer will eventually have to make his own soil tests if he expects to keep his production high and soil healthy.

The old methods, used by every greenhouse man and still used today in greenhouses and on many farms, gave the soil plenty of food, but not always the right kind of food. The thinking went something like this, "If 10 tons of manure an acre raises a good crop, then 20 tons will raise twice as good a crop," And, "If plants have a disease you get out and spray them before it spreads to some other plants." But the old answers failed to satisfy Pretzer; he wanted to get at causes rather than effects. His understanding of nature's way of handling soil and his intuition told him something was wrong in this thinking.

The first objective that Pretzer set for the farm was to get all of the soils in balance and to get the helpful bacteria back into the soil. To establish the soil in a balanced state meant a great deal of observation, experimentation and comparison of growth results. The steam composting which was developed later proved to be a key process in maintaining a balanced condition in the greenhouse area.

Even now, with the soils in approximate balance, not a week goes by that he does not run soil tests on some part of the farm where plants don't seem to be making the right growth. Pretzer uses a soil testing kit (made by LaMotte which costs about $35.00) as an indicator of the

THIS IS the profile of soil that has raised huge crops every year for 80 years. It is not worn out, in fact it is healthier now than it was when it was first farmed. The tomato plant is mulched with 4 inches of straw. The husky root system is well distributed throughout the top-soil zone, and a few roots are entering the subsoil to pick up its trace minerals. Notice the fragmentation of the top-soil which provides a good supply of oxygen. The character of this soil with its good "bone" structure is apparent; there are mineral fragments, from pellets down to particles of microscopic size, giving good soil drainage and making air channels. The clay tiles are for steam which is used for composting once a year.

trend in mineral content. He feels that this procedure will soon be used on every farm on which the operator expects to keep his production high.

The tests for maintaining the correct amount of organic matter in the soil are less absolute. Pretzer gives as a rule on incorporating organic matter into the soil this simple inspection test, which any farmer can use. "Put on a field as much organic matter, that is manure, straw, shredded plant stems, and similar material, as can be reduced to soil by the end of the second year. If organic matter is being plowed up at the end of this time, you have applied too much." Normally, in large fields there is little danger of applying too much organic matter. In small plots the soil easily can be gorged.

"We use as much organic matter as our soils can assimilate," he says. "With our straw mulches we can control moisture in the soil and maintain an open, breathing earth which gives us our fine quality vegetables. In incorporating organic matter into the soil we use mechanical aids such as the disc harrow, plows and cultivator, as well as the acids of mineral salts. To get the best results we must use both. The mechanical aids break down the cellular tissue of organic matter. If a farmer has corn stalks to get into the soil this is particularly important because the corn cell walls are tough. Once the organic matter is chopped up the acids from minerals, along with those from the plant roots and with the bacteria of the soil finish the job of changing the material into soil. Color is an important test. As the organic material changes into soil it darkens from a yellow into the brown of the soil."

To explain his methods of stimulating the soil in the assimilation of organic matter, Pretzer goes back to his comparison of soils with people. "With people," he says, "we know that we can stimulate the appetite with various salts and seasoning. Similarly, in soils we can increase the rate of assimilation of organic matter by use of the soil salts, such as ammonium sulphate, phosphate, potash, manganese, boron, epsom salts and sulphate of iron. To get maximum results, we top-dress the land five times a year, at various stages of plant development. In general farming, once a year will do the job."

His first experiments with tomato seeds had given him a clue to a theory which was later substantiated. He used sterile sand as his basic soil for seedling culture. To this he added diluted solutions of mineral soil salts such as sulphate of ammonia, phosphate and potash. Pulverized composted manure was applied in quantities simulating the best soil balance known at that time. By trying various concentrations and quantities he developed sturdy, vigorous seedlings that would withstand unfavorable growing conditions. The results were so good he wanted to get this same ideal soil condition into growing areas. The problem was to install it in the soils as they existed on the farm. The sand base represented a starting condition which could be used only in small areas. To develop a starting condition in the larger greenhouse area he decided steam might be the solution since it was known to be a quick method of putting soil into a normal state. At Ruetenik Gardens they had been using steam, by the inverted pan method to sterilize the soil. But this steam treatment only took care of the top 6 to 8 inches of soil.

Soil Steam Bath

To get the steam deep in the subsoil a system of underground clay tiles for carrying the steam was worked out. After experimenting with various kinds of pipes they found that ordinary 3-inch clay drain tile was best. It is used with open joints, and laid at 18 inch intervals, 16 inches beneath the surface of the entire 3½ acre greenhouse area. The tile lines release steam into the subsoil as well as into the topsoil. This acts upon the soil to a depth of 36 inches, which is adequate for all greenhouse production. The soil is normally composted with steam once a year, starting in October after the first fall lettuce crop is finished. In using the steam there is no attempt to sterilize the soil, as is sometimes recommended by soil pathologists and which greenhouse men attempt to do. Low temperature steam, and low pressure is used. One section of the greenhouse (1/25 acre) is steamed at a time. The steam penetrates the soil, reducing

it to a normal condition at the same time killing weed seeds and disease spores in the soil. Root knot nematodes, an increasing crop hazard in many parts of the country are killed by this 6-hour treatment. The steam oxidizes the soil, breaking down the organic material into plant food. This gives the effect of composting in a pit, only the steam takes place in 6 hours instead of several month's time. Immediately after the steaming gypsum is broadcast, 500 pounds to the acre.

Dr. E. E. Barnes of the Wooster, Ohio, Agricultural Station, explains the action of the gypsum in this way, "Steam builds up the bacteria population of the soil, causing a rapid production of ammonium carbonate. This is toxic to a number of plants. To neutralize this, gypsum (calcium sulphate) is used to form ammonium sulphate and calcium carbonate. Neither of these are toxic to plants. If the ground can be left fallow for 3 or 4 weeks the toxic effect of the ammonium carbonate would wear off; but of course greenhouse men cannot afford this.

"A heavy application of super-phosphate, 1000 to 1500 pounds per acre, (20%) has the same neutralizing effect since it is made up of one-half gypsum. Triple super-phosphate will not work in the same way as it contains no gypsum. Farmers who plow down a heavy stand of sweet clover and then immediately plant corn will occasionally get the same toxic effect of ammonium carbonate, and the corn will fail to come up. If the corn is replanted the toxic effect usually will have worn off and the corn will grow. But in the meantime 10 days or two weeks has been lost. This delay and seed loss can be prevented if super-phosphate is used following the plowing down of sweet clover. In the greenhouse gypsum has a beneficial effect on the soil since it restores a good nitrogen content in the form of ammonium compounds."

Pretzer compares the action of the steam to that of a steam bath on a person. It relaxes the soil, gets rid of much of the soil excess materials, as the steam condenses and runs off as water, and restores it to its full vigor. Pretzer credits the steam composting with having solved at least two of his old problems: control of plant diseases, and leaching out excesses of minerals and manure to put the soil back in balance. The crops grown following the steaming are usually the best of the year. By the use of this method of composting, the soil is able to assimilate up to 60 tons of organic matter per year per acre.

The steam composting of indoor soils has a slower counterpart in nature for the treatment of outdoor soils. Here weather—snow, rain, freezing and thawing—take the place of the quick steam bath. A further control is to withhold from outdoor areas the minerals and organics that were in excess in indoor soil tests. Balance in the outdoor fields is checked frequently with soil tests to anticipate any plant food deficiency before it appears.

The Year's Production Schedule

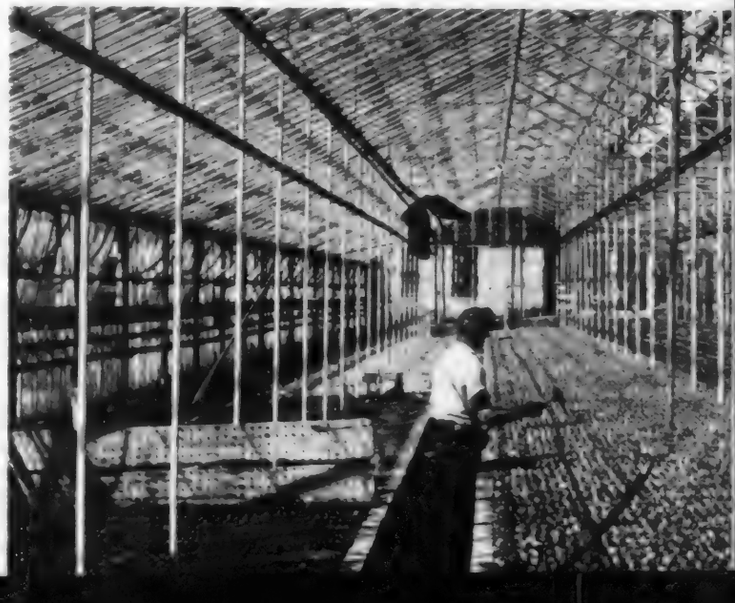
This is a typical year's planting and fertilizing schedule for the 15-½ acres at Ruetenik Gardens. The thoughtful and constant care of each acre of the soil suggests the kind of treatment a good dairyman gives a fine cow. Back of it the same reasoning, "Why feed two cows with the accompanying expense and investment when one good, well-cared-for cow can be made to produce just as much milk?"

The first thing that is done after the turn of the year is to apply fertilizer. The mineral fertilizer is home-mixed and balanced to fit the soil on which it is being applied. The basic formula is constant and would correspond to a commercial 5-10-10 mixture. One of the most important ingredients in the mixture is the ash from burned tobacco stems. The stems are obtained from various cigar manufacturing warehouses in the Cleveland area. They do double duty. First, they are burned in smudge pots to form the heavy nicotine laden smoke which kills aphide that attack the lettuce and tomato plants. Then, the ash is collected from the smudge pots to be mixed into fertilizer. The analysis of the ashes is 35% potash, 30% calcium oxide, 12-½% magnesium oxide, plus trace minerals.

(Continued on page 103)

LETTUCE SEED, a Grand Rapids strain, is moistened and kept chilled, 40°-50°F. for 24 hours before planting. It is broadcast in smooth finished, balanced soil. Note the straw on the soil.

THE SEEDS are then covered with a muslin cloth, not soil, and watered. This gives each seed an even start. When they have germinated, in 2 to 3 days, the cloth is removed. In 10 days they are transplanted into 2 x 2 squares, marked by the spacing board shown in the picture below. Here they grow to transplanting size, with plenty of sunlight and water.



HARVESTING CRANBERRIES by hand is tedious but profitable work. Mrs. A. Bache and five-year-old Freddie will make $200 in 30 days.

CRANBERRIES

BY RICHARD C. BELL

CRANBERRIES are sorted mechanically with equipment which works on the principle that "good berries bounce—bad ones don't."

THERE'S no one quite as busy as a cranberry merchant at Thanksgiving time; that is, no one except the farmers who raise them. But they don't mind the work, for it pays off well.

The nation's cranberries are grown by only a few thousand growers who take home $15,000,000 to $25,000,000 for their crop each year. They have invested about $50,000,000 in not more than 100 square miles of land, which by the ordinary measuring stick, would appear worthless. Cranberry land is highly restricted to three small areas and only a few in these favored localities can expect to go into the business.

The postage stamp cranberry farms are usually not larger than the average kitchen garden. In Massachusetts, where more than half of all the cranberries grown in the world are produced, the small bogs usually pay better than large ones.

Yet these pint-sized farms have been netting their owners around $1,500 annually for each acre—in some areas this figure has climbed to over $2,000.

Cranberry farmers are not worried too much about the market blowing up. So far they have been unable to raise enough cranberries to dent the surface of potential demand and their markets are expanding yearly.

During the growing and harvesting seasons, the cranberry farmer spends countless hours in his bog at back-breaking labor. This is necessary even

though soils and crop scientists have perfected amazing new cultivation methods, new sprays, new varieties and new machines to take part of the speculation and some of the hard work out of raising cranberries.

For example, in the little cranberry community of Grayland, Washington, where growers can hear breakers rolling in from the Pacific Ocean, a mechanical picking machine has been developed which more than anything else has turned cranberry growing into a not too unpleasant and highly profitable venture.

These machines work on the same principle as the family vacuum sweeper. Enlarged and "souped up" they are put through the bogs sucking berries off the vines. One machine does the job of twenty hand pickers, and does it better.

Eastern growers have likewise been experimenting with the vacuum picking machine, one of which is being developed by the National Cranberry Association and given a practical trial last year at Kingston, Massachusetts. The results showed cranberries in Massachusetts bogs can be picked successfully with machines. Growers gave them extensive field trials during the 1947 harvest.

Even before the Pilgrims used this luscious fruit for color and spice at their first Thanksgiving feast in 1621, Indians had pounded the berries into their venison to make pemmican. For more than 300 years the red, acidic cranberries have whetted American appetites and have become one of the favored side dishes to go with turkey, duck, and chicken.

They're Hardy Perennials

Cranberries like a cool climate, damp and generally disagreeable to human beings, and blanketed with heavy fogs rolling in from large bodies of water. Such conditions are rare and have confined production to small sections of a half-dozen states—Massachusetts, New York (Long Island), New Jersey, Wisconsin, Washington, and Oregon.

Commercial cultivation began on Cape Cod and in Middlesex County, Massachusetts over a hundred years ago, and has since developed into a leading export crop of that state. In other producing regions the fruit ranks below other crops in export volume but is still an important source of farm income.

In addition to the cool climate, cranberries like the rich, fiberous muck we call peat. Sometimes peat deposits are many feet deep, although a few inches of peat or even one layer of turf over sand or clay often give good results.

Abundant moisture is a third essential. A cranberry bog should be on or near a stream, or readily accessible to a good water supply as it has to be flooded, often by pumping.

The requirements are rigid, yet there are still thousands of acres of desirable, undeveloped cranberry land throughout the nation. At least three to four thousand more acres are available in Pacific and Grays Harbor counties of Washington state alone. There's room out there for 1,000 families, each with a three-acre bog.

The development of a bog follows about the same pattern everywhere. Matt Perttula of Grayland, Washington, started with a virgin bog and now reaps his yearly harvests. His first job was to clear off the brush which always grows luxuriantly in rich peat soil. It took him a week to clear a single acre.

Then came the "scalping." Equipped with a scalping hoe, a basic tool with a v-shaped, razor-sharp cutting blade and short handle, Matt spent an endless month swinging the hoe, scalping off the top few inches of weeds, grass, roots, and other debris from each acre. This was hauled away.

The scalped field was then leveled to make it as flat as a table top. Then it had to be ditched and drained and made ready for irrigation or flooding.

Soil alone doesn't satisfy a cranberry vine. The bog had to be sanded. From three to four inches of fine beach sand was spread over the entire field to help keep down weeds and to absorb the sun's rays during warm days and in turn release heat back to the berries at night.

Sand also helps keep the bog from drying out, and to serve as a heat-holding blanket to help keep frost away during nippy weather of early spring and late fall. A New Jersey investigator found from five to eight degrees difference in temperature on a frosty night between sanded and unsanded bogs.

On Cape Cod, where sand abounds around swamps, it is usually carried onto the bog over a line of planks by men with special wheelbarrows, although gasoline locomotives and cars are often used on large areas. Early bog makers put on five to six inches of sand but less is now used because it is expensive work.

New Jersey growers, anxious at first to set out as large acreages as possible with their initial investment, felt they could raise cranberries cheaper without sand. However, they found that sanding increases production and eliminates some of the hazards of weather. Almost all bogs are now sanded.

After the sanding, small vines, called cuttings and without previous rooting, are pressed well into the sand. They are put in from nine to twelve inches apart each way and it takes most of a week to plant an acre. Growers have found the closer they are together the better they anchor themselves.

Newly planted cuttings put out roots and new growth within a few weeks, and in three years the ground is completely covered with a mat of woody vine. Some berries are harvested the third year; the fourth year the bog is at full production. And in the meantime there's constant weeding, spraying, irrigating and cultivating.

The Varieties

Early Black and Howes are the most popular varieties grown in Massachusetts and together make up over 80 per cent of the entire acreage. The smaller McFarlin is most widely grown in Wisconsin and on the Pacific Coast.

Costs of developing a bog vary with conditions and locations and wage scales, but a good bog, well located and given good care, should be nearly permanent. There are bogs on Cape Cod over 80 years old which are still in good condition. In Washington the first bogs were developed in 1916. To put one into production today costs about $2,000 an acre.

But the cranberry growers aren't complaining. Last season Perttula's three-plus acres netted him $7,000 after all expenses and taxes were paid. And with his wife and family doing the summer chores he still had time to put in a good season of com-

THIS TRIPLE-THREAT cranberry harvester was built by Oregon grower A. V. Anderson. Three men can pick two tons of berries a day with it. The best hand pickers can gather only 200 pounds in a day, and they'll have scratched, cramped fingers.

SCALPING, clearing the land of miscellaneous weeds and brush, is the first job in preparing a cranberry bog. This is Emil Mandyla equipped with a typical scalping hoe. No machine has been developed to eliminate this back-expending tool.

mercial salmon fishing at Bristol Bay in Alaska.

This sounds like good business, and it is. Of course, there's the constant spraying, cultivating, and weeding, but here again the cranberry men have figured out ways to save work.

In the West nearly every grower has built his own miniature railroad system through his bog. Lightweight flat cars about three feet wide by four feet long are loaded with spray machines and supplies and are pushed along the rails as the spraying is done. This same railroad is used during harvest.

Before any spraying is done, cranberry producers lay out their bogs in sections about twenty feet apart and the width of the field. Strings are used for markers. Then the spray gun operator walks along the strings, making his stepping places. All summer long—as many as a half-dozen times—the nozzle man must step in the same places so that minimum damage is done to the vines. By fall he acquires the skill of a tight-rope walker. Some eastern growers use stationary spray outfits set on the edge of the bogs to pump the insecticides onto the bogs through long hoses and multi-nozzled pipes. Eastern growers also regulate the time of flooding bogs to control some insects, a plan which is not practiced extensively in the West.

New spray mixtures, particularly DDT, are helping growers in all sections. It has cut spray costs to less than a fourth that of a few years ago in Washington state because fewer applications are needed.

Frost and weeds are two big production worries, but here again new methods have lessened the hazards. When frost appears likely, western growers have a number of tricks up their sleeves. They turn on their sprinklers and the spray makes a protecting cover so that a light freeze won't injure the tender fruit. Eastern growers use flooding to prevent frost damage. The warmth from two or three inches of water under the vines will raise the temperature of the air enough to keep the vines from freezing. Frost in September and October may require another flooding, but by this time the berries and vines can endure colder weather.

Weeds cause trouble in all areas. As a control, eastern growers use water-white kerosene as a spray, two or three hundred gallons to the acre. Iron sulfate, used dry in July, controls ferns.

Killing the Bugs

West Coast cranberry men like paint thinner, the same material used by house painters to thin down mixtures, for controlling their weed pests. The thinner, together with other chemicals, has largely replaced pulling weeds by hand, one of the back-tiring and expensive jobs in bog management.

Fertilizer is required in some places. Massachusetts specialists report no advantage gained by fertilizing peat-bottom bogs. Nitrate of soda and acid phosphate often greatly increase the yield on "hard bottom" areas, and fertilizer has been found to help greatly in building older bogs back into higher production.

New Jersey growers mostly limit fertilizers to bogs with soil too thin to support sufficient vine growth. Here they use a mixture of nitrate of soda, dried blood, rock phosphate and sulfate of potash applied at the rate of 335 pounds of the mixture to the acre. Pacific Coast bogs have been found to yield 25 to 35 per cent larger crops by using only about $10 worth of fertilizer to the acre.

Harvesting is the most expensive item in growing cranberries. Some hand picking is still done on Cape Cod and a limited amount on the Pacific Coast; it is more widely practiced in New Jersey. A crew of about fifteen people spend an entire month harvesting an acre by hand picking. Bogs are laid out in strips usually two feet wide and pickers with padded knees and taped fingers crawl through the vines, pulling off the berries, one by one. It is a tedious method of harvest and when labor is scarce, part of the crop may be lost.

Scooping is most popular in Massachusetts and Wisconsin. The scoop used is a medium sized, box-like affair with steel

finger-like projectors in front. The "scooper" goes through the bog, swinging his scoop with a cradle-like motion, gathering the berries. Eastern growers nearly always harvest the bogs before flooding, and afterwards turn water into them to bring up the "floaters." It takes thirteen scoopers and three helpers to pick a 15-acre bog during the season. After harvest the plots are raked lightly with hand rakes in the opposite direction to that scooped to clear up loose material torn up by the scoops and train vines for the next year.

Most western growers who harvest with scoops flood their bogs before scooping, thereby reducing picking time by half. The objection to this is that wet berries do not hold up as well for fresh markets, but if dried out after picking they are as good as any for the cannery.

Still another, and perhaps the fastest method of harvesting, is called washing; it is coming into use in the West. A hose about twice as big as a regular garden hose, and equipped with a flattened out nozzle, shoots out a long, narrow stream which carries the berries along before it.

They are then washed into a two-wheeled, home-made contraption that somewhat resembles an oversized wheelbarrow. It has a canvas covered ramp with false bottom so the berries are forced up by the water, while leaves and waste filter out. The berries go up the ramp into a slanting container and then roll down into field boxes.

One washer and a helper can harvest an acre in a week. Again the objection is wet berries, and some growers feel this system damages the vines.

The shortage of workers during wartime was responsible for the development of mechanical harvesters. Crude picking machines had been used on the West Coast for a decade, often with unsatisfactory results. Now, however, the machines are perfected and over half of the cranberries of the West are picked mechanically.

Eastern growers, too, have become interested and are using mechanical pickers in extensive field trials. One is being developed by the National Cranberry Assn. of Hanson, Mass. and other groups have worked out various devices. Most of them use the principle of a vacuum suction to pull the berries off the vines, although at least one machine is a mechanical "scooper" with teeth combing freely through the vines to gather the fruit. The owner of this machine estimates it does the work of twelve hand scoopers.

The vacuum pickers have one or more large hoses which are worked down through the vines and as the berries come off they whirl through into a circular bin lined with sponge rubber to help lessen bruising. From here they tumble into containers at the bottom. Leaves, chaff, and other debris are blown off.

Into the Boxes

Picking machines vary from small units with a single, two-inch suction hose to a triple-threat device such as one worked out by A. V. Anderson of Grayland, Washington. With three men each working a hose they can pick up between one and one-half and two tons of berries a day. A hard-working hand picker collects less than 200 pounds in the same time.

Not long ago Anderson's machine was given a trial on a Massachusetts bog, and the opinion of the 20 growers who saw it was that the machine will pick eastern berries satisfactorily. The eastern berries are attached more firmly to the stems than the western variety, hence it takes more suction to draw them off.

Once picked, they go through a separating machine—a device which sorts them mechanically. It works on the theory "good berries bounce—bad ones don't."

Unloaded into a hopper at the top, a blower cleans off and removes the chaff. Then the cranberries drop down through a series of slanted bounding boards. The sound ones with a good bounce jump to the next board and so on down, finally to settle on a table where they are packed for market. Inferior ones with no bounce, and remaining leaves or chaff fall straight down into a waste pile at the bottom. In the East most of the berries are then hand sorted by women. Western producers do

(Continued on page 129)

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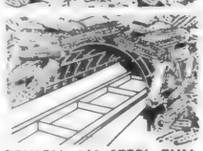

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HOW TO CULL A HEN

(Continued from page 27)

four to six weeks of heavy laying will fade all the yellow from the beak. If the hen has a black or horn-colored beak do not be discouraged; examine the lower beak. When a hen stops laying, the yellow color will quickly return to the beak, beginning at the corner of the mouth and working out towards the tip.

Shanks: The shanks fade slowly, a bleached shank usually indicating production for at least the preceding 15 or 20 weeks.

The high producing hen must have a large and full-functioning set of giblets to make eggs day after day. The breast should be wide and flat, the back broad and flat its entire length, and the entire body deep and full. The "crow head" (a long beak and peaked head) indicates a low producer. The head should be broad, the beak short, and it should have a clean-cut appearance.

The high producer has a friendly, trusting disposition. She does not object too much to being handled and is as busy as a beaver all day long, going to bed at night with a full crop. She is the first one off the roost in the morning and the last to go to bed at night. The low producer is shy, she sets up a loud, hysterical squawking when she is caught, and has a poor appetite because she isn't making any eggs. She spends her time keeping her feathers in order, becomes a pronounced introvert and a chronic primper.

After you have tallied all the points for and against the hen, you may still be wrong about her usefulness. She may be an unusual case. If you are in doubt you can fall back on what you know of her personal history. Hens that are moved frequently from house to house are likely to be thrown into an early molt. A premature molt is also caused by abrupt changes in feeding, especially by a lack of protein in the ration.

Many farm hens get plenty of grain during the summer months but are not fed milk, meat scraps, or fish meal. As a result they do not get the necessary animal food and through lack of this will stop laying and go into a molt much earlier in the summer than they would if they had been properly fed. Such a flock needs better feeding, and in culling, this allowance should be kept in mind. Many good individuals may assume the appearance of culls through faulty feeding or management.

Since broodiness tends to curtail production, some poultrymen make a practice of selling the hens that go broody two or more times during the year. A good way to identify the broody hens is to leg-brand them when they go broody so that they can be culled in the fall.

Often several birds in the flock are either going out of or coming into production at the time of culling. One should know how to detect these birds when handling them. If the beak and shanks are

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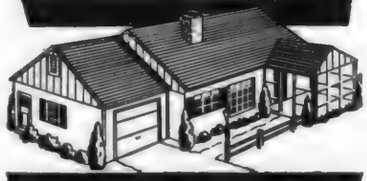

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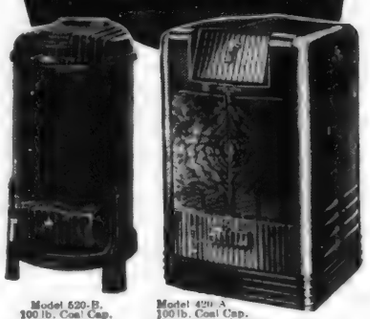

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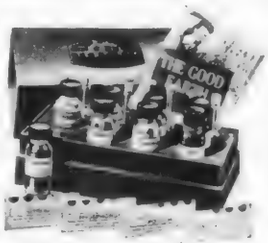

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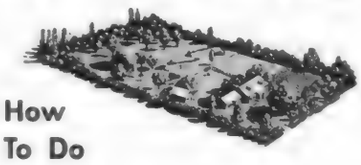

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faded out, with the comb limp and the vent showing some pigment, the bird is going out of lay. In most cases it is a good policy to dispose of this kind. If the eyelids, beak, and shanks show a deep yellow color, the comb and wattles large, smooth, and waxy, with the vent moist and enlarged, the bird is coming into lay. This kind of bird should be kept for a while.

Be extra careful and deliberate in culling the male birds for breeders because a sire's influence on the future of your business is more far-reaching than that of a single hen. A hen's virtues and vices are transmitted to her own eggs only; a rooster has something to say about every egg produced by his harem. Since the power to transmit high egg production is inherited, the place to obtain breeding males is from flocks where the hens have been carefully selected. There is no reliable external test for the transmission of egg production, other than physical development.

The size of the male bird must be considered. He should be an outstanding character. Early maturity is highly desirable, but size must not be sacrificed to obtain it. Too often the extremely early-maturing bird, as shown by the comb, wattles, and quick feathering, is inclined to be fine-boned and undersized.

At the end of the breeding season all male birds except those fancy ones with known ancestry and performance should be culled out. Dr. E. L. Dakan, Ohio Extension Service poultry husbandman, says, "Disposing of the extra male birds not only saves room and feed, but helps keep the eggs from being fertile during the warm summer months. A few hours in a warm room and the embryo of a fertile egg is beginning to be quite a chick."

PLUM VALLEY

(Continued from page 20)

pasture even during the hot weeks in the middle of the summer.

The pasture that he renovated last spring is one of his steepest fields. Emil Backeberg said, "That's the field Harve fell out of a couple of times. Harve doesn't have a run-off problem on that field. The rain just hits it and falls off." There is one spot in it where he couldn't work his old narrow gauge tractor on the contour, but had to get around above the steep place, head down-hill, set the brakes, and slide.

Schroeder's farm isn't completely changed over yet but it is well under way. He has plans to terrace one field and tile a piece of bottom land. He also wants to fence off his woodlots to complete his conservation plan.

It is hard to find a Plum Valley farmer who will deny the value of conservation farming. Most of them are convinced and sooner or later will apply soil and water saving practices to their land. Ray Reineke who owns 160 acres of Plum Valley land

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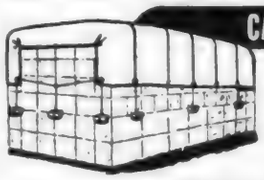

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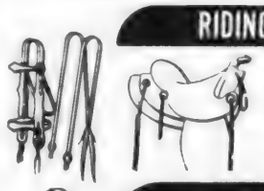

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and milks twenty-three head of Holsteins has been contour farming about as long as anyone in the Valley. He has lived on his farm practically all of his life and can remember when there were plenty of gullies. He says, "It's a little inconvenient getting it started, sure, but this way you don't lose soil. Take that field there below the woods, for instance. I can remember when the face of that field was open to the elements and if 47 drops of water fell there it would roll off the field and run across the road. I guess I've been contouring for about seven years now."

Joe Barbour who has a dairy farm on the ridge at the head of the Valley is farming more land because he started to contour. One of his fields was full of gullies and he had fenced it off and given up planting it. Then he started to farm on the contour. "I've got about 10 acres more land to farm now that I can keep the top soil in place," he said.

Some of the farmers are on the borderline and haven't yet made up their minds or haven't started on the actual work. Leo O'Malley, one of two Irishmen in the Valley, wants to try some of it soon. "I'm not in favor of diversion ditches," he said, "but I do want to try some contour farming when I get around to it." His plan is to build up his fertility first by grass farming and fertilization then to start contouring. "I went to one of the meetings they had but I figured it would look kinda bad for me to belong before I was ready

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ABOVE—Trees show effect of cold in experimental plot where no minor elements were used—Note defoliated condition.

RIGHT—Picture of trees in an adjoining experimental plot where essential minor elements were used—Pictures taken on same day.

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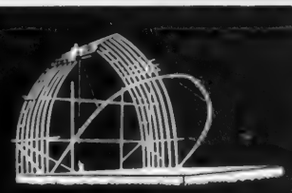
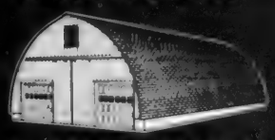


BARN

MACHINE SHED



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THIS SCRAPER was bought by the association to terrace Plum Valley fields.

to do any of that kind of work." He has lived in Plum Valley practically all of his 56 years and can remember when the roads were wagon ruts and most of the hills were covered with trees. He says that "we're going to have to farm on the curve if we want to live here."

One farmer who wants nothing to do with the association or any of its work is Otto Schmidt. Much of his land is flat for his farm lies at the mouth of Plum Valley. He has some sloping and rough fields which he intends to farm in his own way. He says, "contour farming is all right for those who are doing it, but I'm not, so I'm just not interested in it. When I do get ready to do that kind of farming I'll do it my own way and have nice 100-foot strips so there'll be no wallering around the corners. I'll do it myself, too, and not have somebody come out from town and tell me how. Farming from a book is a lot different than farming on the ground."

Another farmer who is hesitant about joining the Association is Charlie Faye. He doesn't think much of contour farming. He expresses his policy when he says, "Let every furry carry its own water."

When Perry Carroll started the Plum Valley Soil Conservation Association, he exposed himself to criticism from the other Soil Conservation Service men in his region. Their objection was that the Plum Valley organization was really an association within an association, for there was already a soil conservation district organized in Sauk County. The whole difference, however, hinged on the fact that here was a group of farmers getting together on their own rather than depending on government agencies to carry out the program.

Dutch Hollow, a smaller watershed just across the ridge from Plum Valley, is organized now and working as smoothly as its predecessor. Carr Valley and Pleasant Valley are making efforts at watershed conservation. When farmers can look across their line fences and see their neighbors profiting from conservation ideas that they can employ, the idea spreads.

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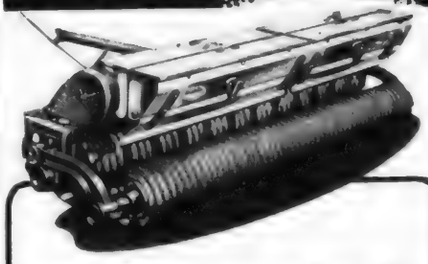

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PRECISION FARMING

(Continued from page 93)

The fertilizer is made by mixing the following basic soil minerals:

440 pounds sulphate of ammonia (for nitrogen)
650 pounds super-phosphate (20%) (for phosphate)
570 pounds tobacco ashes (for potash)

To this is added the following minerals:

40 pounds manganese sulphate
40 pounds iron sulphate
40 pounds zinc sulphate
40 pounds copper sulphate
40 pounds borax
140 pounds magnesium sulphate (epsom salts)

2000 pounds of fertilizer of approximately 5-10-10 analysis.

This is top-dressed and worked into the soil by the two tractors early in January, just ahead of the first setting of lettuce plants of the year. The rate of application is 1000 pounds per acre. Along with this mineral fertilizer 20 tons of composted manure is used per acre. Manure is put into compost piles several times during a year so that a supply is always ready. The method used to make the composted manure is as follows: first, the manure is laid in strips 6 feet wide 1½ feet high and 60 feet long. A band of 20% super-phosphate is then sprinkled over it. Then another layer of manure is laid down. The piles are built up to a height of about 3 feet, are well watered and turned twice in the following 5 months. At the end of this time the compost is ready for use.

After the soil has been given this treatment lettuce plants which were seeded in November in the propagating greenhouses are planted, on about January 5.

In the "nursery" greenhouses the tomato seeds are planted on January 8 when most people are giving their attention to thawing stock-watering tanks. They are seeded in flats that contain topsoil, free of all weed seeds. Great care is taken to get the seeds planted to an even depth of ½ inch. For 10 days these flats are enclosed in an incubator section of the greenhouse where the temperature is maintained at 70 degrees Fahrenheit, day and night. As soon as the seedlings have two well-developed leaves they are transplanted to the open beds of the nursery hothouse into a space 2x2 inches. The nursery attention consists of maintaining constant temperature and applying a light spray of water as it is needed. When the leaf growth covers the ground area they are transplanted into 3 x 3-inch areas, and then once again into 4 x 4-inch areas. By March 15 they fill this space and are ready to go into the large greenhouses where some of them are interspaced with lettuce plants which were transplanted about March 1. The tomato plants are set one foot apart in rows that are 3 feet and 9 inches apart. When they are 12 inches high, binder twine is fastened from the

U. S. Register of Merit Dam L680. R. O. P. Record — 340 eggs. R. O. P. egg weight — 26.2 oz. per doz.

244 acres, 87 buildings—devoted to raising Gasson Strain White Leghorns.

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base of the plant to overhead wires. Then at one week intervals trained workers go over each house, row by row, removing side branches and suckers, at the same time twisting the tomato vine around the twine. When the vine reaches 8 feet in height it is topped.

By the time the tomato vines are getting a good start, about April 15, the lettuce planted in March is ready for harvest. It is removed and the space is covered with 4 inches of organic mulch.

In growing tomato plants, Pretzer points out that the average farmer need not transplant more than once. For greenhouse growing the idea is to cull and select only the best plants, and produce every possible tomato on the high-cost area. For their use they start with 56,000 plants and discard 16,000. With an investment of fifty thousand dollars per acre in glass and equipment, you don't waste a square foot of space.

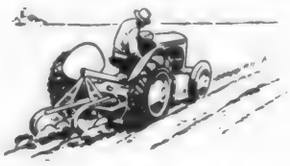
The Artificial Bees

The fruit clusters form, regularly spaced, between 3 leaves growing from the stem as it elongates. The pollination of the flowers is done with an electric buzzer, which jars the pollen loose from the stamens (pollen-bearing part of flower) so it will dust the pistil (member of the seed or fruit part of flower). The buzzer that is used is a recent development of the Walker Electric Company of Toledo, Ohio. Another method of doing the same job is to use a short piece of rubber hose to jar the blossoms. All "suckers" and "side branches" are taken off by hand to put the strength into the development of the main plant.

When the tomatoes have set two clusters of fruit they are mulched with 4 inches of straw bedding from nearby riding stables, at the rate of 40 tons per acre. This contains a certain amount of manure, which aids the plant growth. When the third set of fruit appears an application of 350 pounds per acre of the home-made fertilizer is watered through the mulch. Two more 200-pound applications of special fertilizer are made later as the crop matures. In these later applications mostly nitrogen, in the form of calcium nitrate or potassium nitrate, is used, depending on the need for calcium or potash. The vines on an average have a total of 7 settings or clusters of tomatoes of 4 tomatoes each.

The tomato crop will ripen by the end of the first week of June and continue until the middle of August. Simultaneously with indoor harvests of tomatoes, which are carefully timed to fit the housewife's and restaurant's demand for "makings" for spring salads, the outdoor activity has started. Depending on the weather, but usually about the first of April the two tractors are turned loose outdoors. Pretzer, with his ability for devising labor and time saving methods, has worked out a combination of three tools on a single hydraulic

EVERY HOUR COUNTS
WITH LABOR COSTS AT PEAK



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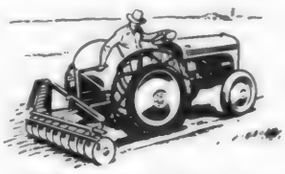

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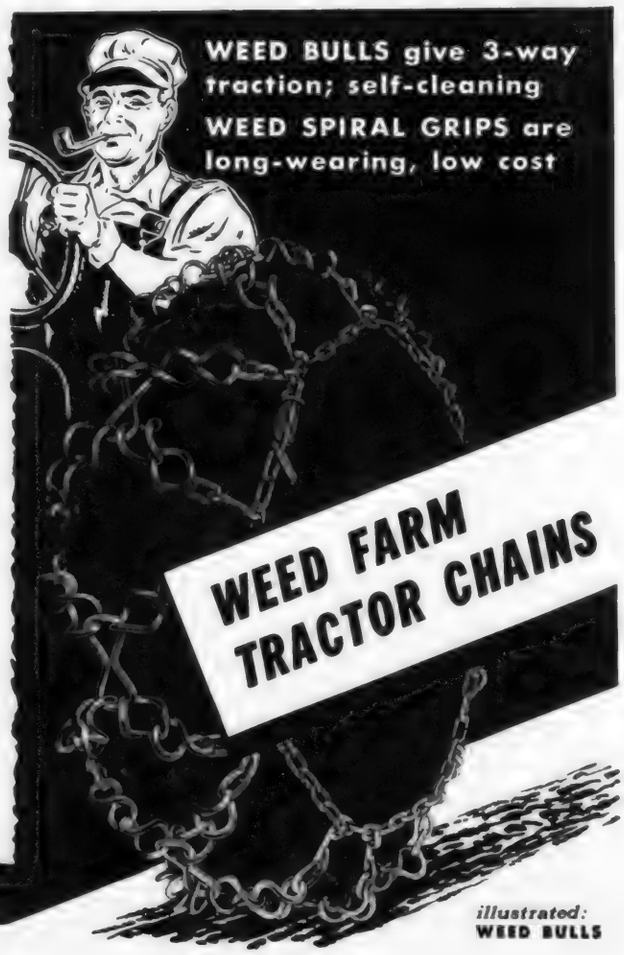

illustrated: WEED BULLS

mount for his tractors. A tiller (Ferguson type is mounted directly back of the tractor. This replaces the plow, tearing up the soil to a depth of 9 inches, properly fragmenting and aerating it. Just back of the tiller is one row of thin 12-inch straight discs set straight to slice rather than throw the soil. Next is a heavy board set at a 30 degree angle which acts to drag and level the soil. Finally comes another 2 rows of 8-inch discs, set straight also; these finish the soil to a raked surface and give it a good texture. With one trip through, the soil on a five-foot strip is given a preparation which is approximately the same as that of a plow, Acme drag, and a Meeker harrow.

The crops planted outdoors are celery, beets, rhubarb, spinach, endive, and radishes. The soil management and treatment is similar to the indoor area except that there is no steam composting, and the work follows the weather. The radishes are slipped in at times when Pretzer figures they will be ready when there will be a good demand without the excess supply which causes prices to fall. In all of his crop planning he uses a long-range weather service, which he confesses has the same appeal as the one-year advance weather forecast calendar that the local drug store used to pass out. The differences are that this scientific service is built on the long-range weather forecasting that was developed before and during the war, and it costs $45.00 a year from the Krick Weather Service, Pasadena, California. The outdoor crops are kept in a harvest procession from May until November, when the heavy frosts hit this area. Celery is blanched with shields of laminated paper impregnated with asphalt, which can be rolled up and re-used many times.

Meshing indoor and outdoor crop plantings and harvests is a problem in management which Pretzer insists he "figures out as he goes along." Other growers in the neighborhood have their own theories on how he does it, with ideas ranging from voodoo magic to a private wire to mother nature.

As the 8-foot tomato vines are cut, starting on August 5, they are hauled out of the greenhouses and run through an ensilage cutter to make a mulch which is used on the outdoor celery. This mulch is rich in nitrogen, approximately 12%, and has many other minerals that develop a beautifully modeled celery stock.

Following the August harvest of tomatoes the hothouse soil is steamed and receives its 500-pound per acre application of gypsum which is tilled into the ground with the mulch left over from the tomatoes. Several runs through the greenhouse are made with the combination soil preparation tool to fragment the soil and incorporate the heavy mulch. Leaf lettuce is then transplanted from outdoor seedbeds. This is harvested the first week of October. Another planting follows, this one from indoor seedbeds. This is ready for harvest

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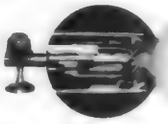
New Wayne, Thermatic design, burns oil cleaner with dual air control.



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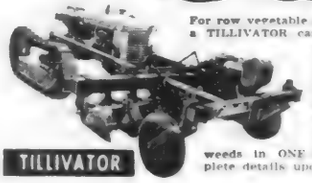

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ARIENS COMPANY
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during the week from Christmas to New Year's Day. Then it's time to start over, with the additional know-how that has been picked up during the year's work.

The Night is Made for Rest

The question Pretzer is most often asked is, "Don't soils need rest?" To this he has this comeback, "Certainly, like people, soils rest at night when plants rest. A 2- or 3-week vacation period is also needed during the year. Actually, what most people and most soils need is diversion. Our soils get that since we are constantly changing the crops grown on them. In Biblical days we read of soils being given a sabbatical year of rest. When this was possible it was fine, but now with our better understanding of handling soils it is no longer necessary, nor economically sound."

No desk farmer, Pretzer is invariably among the plants, indoors and outdoors, working with the plants smelling and running tests on the soils. When he is not in his office he is difficult for a stranger to spot. His baseball cap, blue shirt and pants look just about the same as the work clothes of the other men. But if you stand and watch for a few minutes he soon stands out by his restless approach to all of the jobs on the farm. He may be pointing out the most efficient method of using a dibble, to a new man, or slowing down the speed of a tractor to get the exact fragmentation of the soil for incorporating the maximum amount of air.

Picking up and sniffing some of the top-soil he commented, "A good soil smells like the deep forest vegetable mould. A choked and air-locked soil smells like carbide gas." When the weather is warm Pretzer likes to run his soil tests often. The rains and sun leach the heat the nitrogen, lime and potash out of the soil rapidly. The plants are making rapid growth. If they can't get the nitrogen and lime they will not make a healthy growth. This year a quick soil test of two sections of the outdoor celery plantings which were turning yellow saved about $1200 worth of produce. One section showed up as short of lime, another was low in nitrogen. An application of these minerals brought the plants back to a healthy green in 5 days.

When one considers the tremendous amount of hard work that is necessary in this kind of specialty farming, even with mechanized equipment, the question of labor comes up. M. L. Ruetenik felt strongly enough that the men who helped make the profits should share in them. Forty-five years ago he started the profit-sharing plan which has since been studied by a number of firms, among them U. S. Steel.

The basic wage at Ruetenik Gardens is competitive with the other farming operations in the neighborhood. In addition, any regular employee is permitted to invest up to $2500 in the firm. Dividends are paid on the total investment of the em-

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ELECTRIC
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Nationally known Dairy and Health Authorities say: Clipping prevents dirt accumulation—the chief source of sediment in milk. Clipped cows are easier to keep clean, take less time—produce milk with lower bacteria count and less sediment—it is more desirable milk, brings more money. For best clipping results use Clipmaster. Powerful, air-cooled, smooth-running motor inside the Easy-grip handle. Can also be used for clipping horses, mules, dogs, etc. Model 51-1.

Stewart clipping equipment is available at good hardware and implement dealers

SUNBEAM CORPORATION
(formerly Chicago Flexible Shaft Company)
5600 Roosevelt Rd., Dept. 147, Chicago 50, Ill.

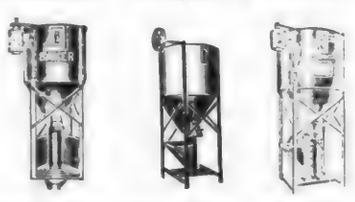
Don't Let LIGHTNING Do This To You!
LIVES ENDANGERED! TREES SPLINTERED! BUILDINGS DAMAGED!

A valued tree hopelessly splintered is only one of the serious dangers when lightning strikes near your home. Lightning jumps from trees to buildings.

ALUMINUM or COPPER SYSTEMS
Install an inconspicuous Electra Protection System now! Write for name of local representative and free estimates.

Electra Protection Co., Inc.
Dept. FB, 11 N. Pearl St., Albany, N. Y.
Dealerships for Those with Facilities

For QUALITY FARM EQUIPMENT



Below the Floor Bevel Gear Drive Above the Floor

FEED MIXERS

CORNSHELLER

WRITE FOR LITERATURE AND SEE THE MANY DISTINCTIVE FEATURES OFFERED IN SCOTTDEL'S LINE OF FARM EQUIPMENT

SCOTTDEL, INC.
DEPT. "J" SWANTON, OHIO

ployee in the firm, plus his yearly salary. For example, if an employee has $2500 invested in the firm and earns $2000 in the year, both of these sums are thrown together and considered as a capital investment of $4500. If the farm makes a 25% dividend on the total capital investment, this employee would receive an extra $1125 as his dividend on his time and money invested in the firm. With the gross income on the total 15-½ acres approaching 150 thousand dollars a year the employees have made a good living while doing the kind of work they enjoy most.

An old Ohio farmer who stopped in to see Pretzer's 15-½ acres shook his head and said, "Son, you have a 'green' thumb; there's no other way to explain such crops." But Pretzer puts the explanation for his crops in a package as neat as those he ships to market, saying,"It's only the natural result of knowing my soil and giving it good husbandry." That, he believes, is the kind of farming Americans must come to if we are to turn our land over to our sons better than we found it. And his face lights up as he says,"My boy, Richard, is taking over now."

Lumber When You Need It

(Continued from page 49)

Farmers who live near a sawmill can make an extra profit by having their logs sawed into boards. When dried these can be sold to lumber yards or consumers at much higher prices than the timber would otherwise bring. After it is sawed it must be stacked for drying, with each layer separated by blocks, and the whole stack covered to protect it from weather. It now costs about $15.00 a thousand to get timber sawed at the mills. To this must be added the cost of handling and hauling. Well-cured, unplaned hardwoods now sell for about $120.00 a thousand. In the woods these same trees would bring $30.00 to $50.00 a thousand. Cheaper lumbers such as pine will bring about $85.00 cured.

When you get ready to sell timber, check around the markets for the best bids, for markets will vary, depending on the type of timber they want. If the prices are not what you expect, keep your timber; it won't spoil. When you find a buyer, draw up a written agreement with him.

The purchase of a sawmill is not economical unless you have 200 or more acres of good timber. For the smaller acreages, it is better to make use of the sawmills that are already operating around the country.

Once you have solved your logging problems and have your timber on the ground, it will be best for the timber if you can get it off to the mill without delay. Most farm logging is done during the winter in the Midwest. Logs can lie on the ground for two or three months in winter without damage. If you do summer log-

Special 25th Anniversary Sale

GOLDEN RULE CHICKS

Send for big FREE Anniversary Gift Offer

25 CHICKS FREE

with every 200 you buy during our 25th Anniversary Sale

Big EXTRA PROFITS are yours during our 25th Anniversary Sale. Yes, Sir . . . that's our record . . . 25 years in the business of breeding *superior, profit-making chicks* . . . *superior* for strength, health and livability . . . *superior* for meat and eggs. And during our 25th Anniversary Sale we'll send you 25 healthy chicks FREE with every 200 you buy.

Hatched in an Ohio-U. S. Pullorum Controlled Hatchery, these chicks are backed by our 25-year record of breeding *strong chicks* for strong profits. A strong flock eats no more than a weak flock and is much less trouble to care for . . . so why not feed the very best chicks and *be sure of a profit every year.*

100% LIVE DELIVERY GUARANTEED

Only by careful breeding for strength and livability can we make such a strong guarantee. Think of it! 100% live delivery, 98% livability GUARANTEED for 3 *full weeks*. And Golden Rule superior chicks are as strong as our guarantee. They have to be . . . Golden Rule breeds them especially for superior quality. 18 popular breeds to choose from, all guaranteed strong, healthy *profit makers*. Sexed chicks available.

FREE Catalog

Write for our big new catalog and 25th ANNIVERSARY FREE GIFT OFFER. It's new and full of profit-making poultry ideas. This big new 25th Anniversary Catalog, profusely illustrated, will show you how to make extra profits on Golden Rule chicks. Catalog contains complete information on all breeds. 1948 price list included. Write for your FREE catalog today.

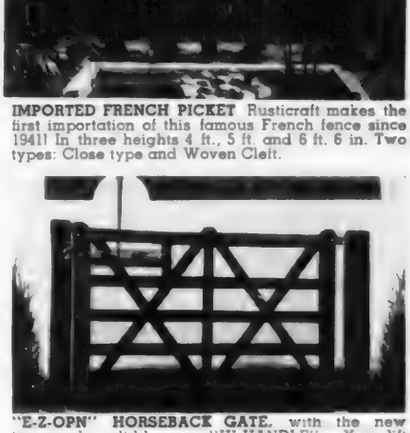
GOLDEN RULE HATCHERY • BOX 49 • BUCYRUS, OHIO

FENCES FOR EVERY PURPOSE

WOVEN (Domestic) PICKET Made of half round cedar saplings in two types. In close type pickets are tight together. Cleft type has ⅛" space between permitting passage of sunlight and air.

IMPORTED FRENCH PICKET Rusticraft makes the first importation of this famous French fence since 1941! In three heights 4 ft., 5 ft. and 6 ft. 6 in. Two types: Close type and Woven Cleft.

POST AND RAIL Made of selected hand-split Chestnut. This fence is available in both the 3 and 4 rail types. A strong, beauitful, long-lasting, all-purpose fence. Rugged beauty.



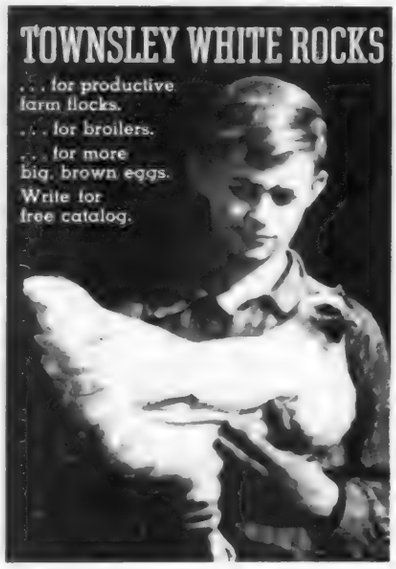
"E-Z-OPN" HORSEBACK GATE. with the new improved, solid-bronze "HI-HANDLE". You lift the handle to open gate while sitting erect and solidly mounted. Widths from four to twelve feet

Rusticraft fences and gates will meet your every fencing need. Only the finest of selected timber is used. There is a Rusticraft gate to match each type fence. Prompt Delivery.

Write today for Illustrated Booklet and Prices.

Rusticraft FENCE CO. DAVID TENDLER, Est. 1918 20King Road, Malvern, Pa.

TIGHT SCREEN AND WOVEN PICKET · ENGLISH HURDLE · POST AND RAIL
FARM GATES · HORSEBACK AND SELF LOCKING FIELD GATES
IMPORTED FRENCH PICKET FENCE



The large, modern hatchery "On top the hill" on T. S. Townsley's R. O. P. Trapnest Farm . . . invites you to write for proof that Townsley White Rocks are doubly productive. More pounds of meat and more dozens of eggs! Large, beautiful birds like the above. Write today!

TOWNSLEY TRAPNEST FARM & HATCHERY
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Get HIGHER YIELDS BETTER CROPS BETTER SEEDBEDS WITH A SEAMAN ROTARY TILLER

Typical of the Better Crops obtained from Better Seedbeds prepared by SEAMAN ROTARY TILLERS (in preference to conventional tillage methods) are reports such as these:

- Almost complete elimination of potato scab and increased yields of higher graded potatoes, increases often ranging from 20 to 40 bags per acre.
- Oat yields frequently increased approximately 20%.
- Better corn . . . lower moisture content and earlier maturity . . . with higher yields and increased profits — in some cases sufficient to pay for a Diesel-powered Seaman Tiller in one year!
- Increased sugar beet yields . . . with larger beets and heavier plant growth above ground.

With a SEAMAN ROTARY TILLER (made in both power take-off or motorized models) you can prepare just the kind of a seedbed you want — to suit your soil and crop conditions — at a great saving in time and labor, and control weeds and crop pests to a high degree. Get all the facts. Fill out and mail the coupon today — and see your local SEAMAN TILLER dealer. Ask him for a demonstration. If there is no Seaman dealer in your locality, send us the name and address of the dealer you like to do business with.

SEAMAN MOTORS, Inc. 350 No. 25th St. Milwaukee 3, Wis.

Without obligation, send complete information regarding Seaman Tillers. I farm . . . . . acres.
Name . . . . . .
Address . . . . . .
Dealer's Name . . . . . .

ging, however, they shouldn't be exposed to the weather for longer than three weeks. Disease, fungi, and wood boring insects may damage them and cut their value.

With increasing industrial use of timber and decreasing forests, there is little danger that farmers will have trouble selling their trees. Wood using industries constantly have buyers scouring the countryside for timber to purchase. Railroad ties alone constitute a big market. At least one railway company is taking steps to insure a future supply of wood. The C. & N. is using a mechanical tree planter to aid farmers in reforesting worn out land. They recently started reforestation by planting 10,000 seedlings on eroded land near Spooner, Wisconsin.

From Woodlot To Barn

One successful Midwest farmer says, "Our woods came in very handy in building our barn. We cut walnut trees—they were the best size and the easiest to get out —took them to the sawmill and had them cut into heavy timbers for our barn. So instead of selling to a timber buyer at $40.00 a thousand and buying back less valuable lumber, in not nearly heavy enough sizes, at $150.00 a thousand, we made use of our own timber. I figure this was the best and cheapest timber that went into the barn. It figured at $12.00 a thousand."

NUMBER OF TREES PER ACRE IN A GOOD WOODS.

Inches Diameter	Number per acre
2″ to 6″	200
7″ to 16″	75
17″ and over	25
Total	300

This woods will contain about 10,000 board feet of salable timber over 12″ in diameter at breast height 4½ feet.

Roy Hildreth of southern Indiana has a 45-acre woodlot that he keeps in a paying condition. He harvests timber from it every four years and has a good record of the profit from his land. During the past 10 years he made an average of $14.20 per acre by selling when the market was right and not letting the by-products, such as fuel wood, go to waste. The money isn't his only reason for keeping the woods. "When the relatives come out from town," he says, "and the kids want a picnic dinner, there isn't any better place to go than back to the woods. We older folks enjoy the woods as much as the kids. I've built a picnic table back there and an outdoor oven that's a honey. We get a lot of fun out of that woods." This farmer, like many others, keeps his woods in a healthy condition for pleasure and profit.

Cut Feeding costs up to 40%

Beat high overhead expenses by grinding your own Corn, Wheat, Oats and Hay with BELL'S New Modern Hammer-Mill. Remember, it's the money you SAVE in Production costs that determine the Profit you make.

STOCK AND POULTRY
NEED GROUND FEED THE YEAR 'ROUND

1000 lbs. of properly ground Feed often produces as much meat or milk as 1250 lbs. of unground feed, and you can save on grinding costs, too! Doyle Allison, Hog Breeder, reports cash savings of $122.50 in 60 days. R. W. MacGregor saves $18.50 in grinding cost on ten tons of corn and barley. You can grind your own feed for as little as ½ of a cent per hundred pounds, with a

BELL'S NEW MODERN HAMMER-MILL

Learn how easy it is to own one of these profitable Mills (made in two sizes) and start increasing your Profits immediately. Send postal today for full information, address—

THE C. S. BELL CO. Mfrs.
Dept. F - HILLSBORO, OHIO
CORN SHELLERS HAMMER MILLS FEED MIXERS

THE NEW

TOKHEIM TRACTOR CAB

Gives you year-round use of your tractor — in comfort! Perfect protection against sun, snow, rain, sleet. Streamline design. Safety glass windshield. Lower front, side and rear curtains roll up or may be removed in hot weather. Easily installed on tractor without special tools or equipment. All-steel construction; insulated turret top; removable metal floor enclosure. Moderately priced. Will fit Farmall H and M, and Case VA, VAC and VAI tractors. Available later for other makes.

General Products Division

TOKHEIM OIL TANK AND PUMP CO.
FORT WAYNE 1, IND.

FEATURES
Easily installed
No body rumble
Streamline design
Maximum visibility
Safety glass windshield
All-steel construction
Insulated turret top
Painted to match tractor
Year-round comfort

TOKHEIM FARM EQUIPMENT

SEE YOUR IMPLEMENT DEALER OR WRITE FACTORY

LUMP JAW

(Continued from page 53)

rather indifferent success in combatting lump jaw. Sometime it appears to bring about relief or a cure, but often its use fails to check the progress of the disease. If this remedy is used it would be well to have expert advice because its administration is not without dangers. The ability to tolerate the drug varies with individual animals and even in the tolerant animal there is a limit to toleration. Usually it is advisable to give potassium iodide intermittently, the intervals to be governed by the effect on, and reaction of, the animal under treatment.

A newer and much more effective remedy is sodium iodide, but this should be injected properly and accurately into the blood stream. The intravenous administration of drugs has many advantages but there are important dangers that must be considered. The earlier reports that sodium iodide could not safely be given to cows carrying calves because of the danger of producing abortions does not appear to be supported by more recent information. Veterinarians now say that the treatment has been given in various stages of pregnancy without interrupting the gestation period. This discovery is fortunate because in dealing with a disease such as lump jaw waiting several months for pregnancy to terminate might permit the diseases to progress to a stage where treatment would be ineffective.

Favorable reports have been received on the use of sulfa drugs in treating human beings infected with actinomycosis.

There is no evidence to indicate that immunity to lump jaw can be developed by an attack of the diseases or artificially through vaccination. Help, if any, in this respect lies in the future.

Salvage

Delay in the treatment of lump jaw not only may result in the loss of the animal but each day the disease is permitted to develop adds to the suffering of the animal. One glance at a deformed and swollen jaw of a stricken animal will be convincing proof that great pain is present. Delay may be charged to ignorance, procrastination, or a desire to get everything possible out of the animal, either in calves or milk production, before it is destroyed.

Should the economic factor be the cause of the delay, be sure that you do not gain a calf and a few gallons of milk, and lose the slaughter value of the animal. The disease at the beginning is almost always local in nature and may not develop noticeably for some time. There is ample time for treatment, but don't put it off for this reason. If it is allowed to develop the infection may become general, the animal will become greatly debilitated or even emaciated, and as such be unfit for food. Remember that the disease usually affects structures close to the mouth—the entrance to the digestive tract and the place

The newest and latest in cow stalls—the LOUDEN "Testall". Each cow has her own individual water bowl, salt cup, and feed manger. Your animals will set production records in "Testalls" and there's little possibility of injury.

LOUDEN

FARM BUILDING EQUIPMENT & PLANS

Save You TIME, LABOR
UP PRODUCTION AND PROFITS

Farmers have been buying Louden farm building equipment longer than any other kind. In fact, ever since 1867, when Louden introduced the original Hay Carrier. From then on, Louden has pioneered and introduced practically every other piece of modern equipment...the first Litter Carrier, the first Flexible Door Hanger, the first all steel Cow Stall, and the first individual Automatic Water Bowl.

In making always better equipment, Louden designed the "Iron Claw" Hay Fork; "Bonded V Rail" Door Track; "Bullet-End" Stall Partitions; "No-Spra" Nose Plate for water bowls; and "Testall" Cow Stalls; to mention a few. And other new advancements are on the way.

So buy Louden equipment . . . always FIRST . . . always BETTER to help save you barn work, time, and labor . . . to get more production and more PROFIT!

EVERYTHING FOR YOUR FARM BUILDINGS

A complete line of modern Steel Stalls and Stanchions . . . Water Bowls . . . Feed and Litter Carrier Systems . . . Ventilating Systems . . . Hay Unloading Tools . . . Sliding Door Track . . . Hog House Equipment . . . and a complete Barn Plan Service.

See your nearest Louden dealer today. He may have in stock or can get the equipment you need. For his name or address, write us.

IRON CLAW FORK

LITTER CARS

FEED TRUCKS

THE LOUDEN MACHINERY COMPANY
(Est. 1867)
3212 E. COURT STREET FAIRFIELD, IOWA
Branch, Albany, N. Y. But Please Direct Inquiries to Fairfield

THE *First* NAME IN BARN EQUIPMENT *has Always been* LOUDEN

runts into RECEIPTS in just 30 DAYS

ARCADY Hog Boost'R*

* A HOG RECUPERATOR

● Arcady Hog Boost'R is a great new feed especially enriched and fortified by Arcady's exclusive *Emulsified* process to correct nutritional deficiencies or after-effects of pig troubles. It is not a medicine or a remedy. The way Arcady Hog Boost'R puts unthrifty "boarder" pigs back on the road to health, gains and profits pleases the most exacting hog feeders. Write for "Picture Proof" photos showing runty pigs that gained 2½ pounds per day and reached marketable size in just 30 days.

A Feed and Feeding Program for Every Farm Need

ARCADY FEEDS

ARCADY FARMS MILLING COMPANY
223 W. Jackson Blvd. Chicago 6, Ill.

where food has its first preparation for digestion. Should the tongue and teeth become so affected as to interfere with the function of the mouth, and they do, the whole animal will go down hill in a hurry. The result will be loss of weight, at least, and possibly loss of the entire carcass.

Federal regulations, upon which practically all state and city regulations are based, state that "carcasses of animals showing generalized actinomycosis (lumpy jaw) shall be condemned," but that "carccasses of animals in a well nourised condition showing uncomplicated localized actinomycotic lesions may be passed after the infected organs or parts have been removed and condemned." It is also provided that in very slight localized infection, the head, including the tongue, may be passed after the affected part is removed and condemned.

Summarized briefly, here is the situation in regard to lump jaw: It is usually a localized condition affecting the head region of cattle. The disease is not contagious in the ordinary sense of the word. Early diagnosis and prompt treatment may result in complete cure. Animals do not develop an immunity to the disease and it may appear at any time. Delay in applying treatment or disposing of an affected animal will probably result in increased suffering for the animal and decreased owner returns. Consult a good veterinarian as soon as symptoms appear.

Potash salts are considered the most apt to cause "burn" but many carriers of nitrogen, even slow acting organics like cottonseed meal, may, in the presence of high soil temperatures, cause injury. As a rule, the largest yields and the greatest safety is secured by placing the fertilizers in bands about two inches to the side of, and the same distance below, the level of the seed or seed piece.

Most modern fertilizer placement machinery, particularly corn and potato planters, are constructed to place the fertilizer in bands at the side of the seed. This equipment not only prevents "burning" but also greatly increases the efficiency of the fertilizer.

Nitrogen is associated with the quick starting growth and the production of leaf and stem. This is particularly important on grasses and leafy vegetables.

Phosphorus is the foundation of the strength in the plant and produces a deep root and a stiff stalk. It helps in the maturing and ripening of crops. Well phosphated corn may mature from 5 to as much as 12 days earlier than corn inadequately supplied. It also enables the crop to utilize larger amounts of the other plant food. Part of the phosphorus supplies act as a catalytic agent to speed the utilization of the other plant foods required by the crop.

Potash is largely valuable in the production in the plant of the starches, sugars

Guidepost to a Wise Investment...

More Reputable Implement Dealers Stock and Sell *Bolens HUSKI* Than *Any Other* Garden Tractor!

YOUR BOLENS HUSKI DEALER is your neighbor — a familiar, long-established organization in your community that may be counted upon for friendly, dependable service. The BOLENS HUSKI Dealer is sincerely interested in helping you maintain your Bolens HUSKI Tractor and its "Packaged" Implements and Tools at peak efficiency. He, and other reliable dealers like him throughout the nation, have established their businesses and reputations through square dealing and dependable service.

There are many makes and kinds of Garden Tractors on the market today. But not all of them will be here next year — or the year after. Just as important as the equipment itself is the producer who builds it and the dealer who sells it. The name BOLENS has been identified with dependable performance in Garden Tractors for over 31 years. Without exception, Bolens dealers will be among the leaders in their communities.

Bolens Tractors

The Bolens HUSKI Power-Ho
1½ H.P. Model. Designed for "city farmer," small acreage farm, institutional, industrial applications.

The Bolens HUSKI Gardener
3 H.P. Model. Popular with farmers, commercial growers, orchardists, and nurserymen.

VISIT YOUR NEARBY BOLENS DEALER TODAY, and let him give you a new idea of Garden Tractor economy, convenience, and service.

Bolens HUSKI 2-WHEEL TRACTORS

BOLENS PRODUCTS DIVISION
FOOD MACHINERY CORPORATION
273 Park Street, Port Washington, Wis.

STANDARD FOR OVER 30 YEARS

and fruit juices. It helps fill the kernels with plump grain. Acting with phosphorus it increases the strength of the straw and helps to prevent lodging of grain. Potash acts as a disease preventative, especially "rust" on cotton.

INSIDE OF A COW

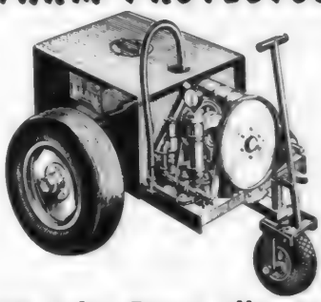
(Continued from page 81)

front to back and not pendulent. It should have well-balanced quarters and a level floor. It should be of fine texture like a baby's cheek and not have a meaty feel but be soft and pliable when milked out and should hang in folds. The pendulous udder fouls easily and is easily injured and the organs which make the milk are farther removed from the body than in the long udder. A funnel-shaped udder is also undesirable as it lacks capacity. The quarters should be uniform and care should be taken to note any bad or off-shape quarters.

Draw a stream from each teat. The teats should be evenly spaced, of convenient size, far enough apart to prevent interference while milking. They should not be uneven, short, or very tapering. Many fine milkers have poor teats but generally high production is indicated by good teat development. Pass the hand along the cow's belly forward from the uder; the veins leading from the udder to the heart will be felt. These are known as the milk veins and are the only visible indicators of the amount of blood that passes through the circulatory system of the udder. They are known as milk veins although they do not contain any milk at any time, but carry blood from the udder to the heart The arteries which carry blood to the udder are all within the body of the animal. The milk veins do, however, indicate somewhat the capacity for producing milk. Some judges believe the milk veins should be long, large, tortuous, and branched. If they are followed to their extremities, they will be found to enter the body through openings which can be felt with the finger. These are known as milk wells. They should be large, and, of course, as numerous as the branches of the veins. Small wells indicate small blood supply.

GENERAL APPEARANCE—15 PER CENT—Now that the cow has been gone over from head to foot, stand off and take a good look at her. Does she please you? Does her general appearance excite your sixth sense? While she is being handled she should be gentle and quiet, but should also show spirit under control. Her health and vigor will be shown by her general alertness, by the glossy character of her coat and its softness and pliability. She will seem wide awake and her barrel and udder should give the impres-

SPRAY LIVESTOCK
the easiest way with a
FARM PROTECTOR



NEW John Bean all-purpose HIGH PRESSURE SPRAYER

Increase meat and milk production by quickly and easily ridding livestock of flies, lice, ticks and grubs. High pressure ***Farm Protector*** power sprayer gets down to the hide. And to save time and money on dozens of other spray jobs you'll use a ***Farm Protector*** every day!

NEW FARM PROTECTOR brings advantages of high pressure (400 lbs.) spraying to every farm. Sturdy, portable, 50-gal. tank, clean design, moderate cost; many new features!

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Division of Food Machinery Corporation
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Mail this coupon for free booklet "F" on the new Bean **FARM PROTECTOR.**

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WOOD TANKS FOR ALL PURPOSES

BOTTOM VIEW OF TANK SHOWING CONSTRUCTION

Wherever tanks are needed you'll find that there is an economical, quality built wood tank by Breyer Bros., Whiting & Co., that is best suited for the purpose.

Forty years of leadership in the manufacturing of wood tanks is your assurance that we can serve you best.

Round End Milk Cooling tank, illustrated, provides more room for milk cans, and heavy redwood construction keeps milk cool longer. Easy to keep clean. Built to accomodate 7½ to 10 gallon cans. Covers for all sizes, extra.

Tank Can Capacity	Height	Width	Length
4	2½	2½	4
6	2½	2½	5
8	2½	2½	6
5	2½	3	4
7	2½	3	5
9	2½	3	6

BREYER BROS., WHITING & COMPANY
WAUPUN, WISCONSIN

Write for Information and Prices

YOUR COWS

may respond to Cobalt, Copper, Manganese, and other "Trace" elements.

Expert herdsmen demand a mineral tonic for cows before and after calving. They feed it as precaution against low blood minerals associated with milk fever.

Feed-tone also gives all animals an "extra lift" in breeding season, and extra building up every season. Just 2 ounces a day supplies supplemental iodine, cobalt, manganese, iron, copper, boron, zinc, calcium, soluble phosphates — plus Vitamin D and appetizers.

HERMAN NAGEL

Send $1 for generous trial sample. Also available in 50 lb. bags. Money back if you're not pleased. Feed-Tone was formulated by the specialist in mineral nutrition—Herman Nagel.

THE HERMAN NAGEL CO.

53 W. Jackson Blvd., Chicago 4, Ill.

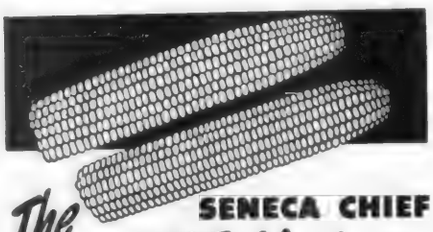
sion of being ready to burst with production. She should not appear plump or fat at any part because this indicates that her feed is going into flesh and not into her udder as milk.

The Professor Picks a Cow

Dean Victor A. Rice of the College of Agriculture, Massachusetts State College, gives these general rules for selecting high production cows. "The size of the cow and the size and quality of her mammary development are the most important things to consider in trying to select higher production. Statistical studies have shown that there is a higher correlation between milk production and size than there is with any other single characteristic. Studies of D. H. I. A. records by the Bureau of Dairy Industry also indicate that, on the average, larger cows produce more than smaller ones do. If one wants a high producing herd of cattle, size is certainly one general yardstick that can be used to advantage. By size, of course, we mean body capacity, depth and width through the heart and chest, depth and width through the belly region. Unless an animal has a big middle, it is going to be difficult for her to handle enough feed to produce at a profitable level. Get good, big cows, especially big through the middles. The other important thing is, of course, size and quality of the mammary development. This rates 30% on the score card—higher than any other one item. If in selecting cows, we would pick big ones with big, well attached, fine qualitied udders with good teat placement and good veining, we would have taken the two largest steps possible toward the goal of selecting high producing cows from their exterior appearance. To have good heads and necks, to have strong, square set legs, to have a generally pleasing symmetrical appearance, are all to the good, but the main driving wheels in milk production are both by theory and by common experience good, big middles and good, big qualitied udders."

The Score Card is a Guide

If you are buying a single individual, tally up her points and if you find that they add up to 100, you have a perfect animal; 90 indicates an exceptional animal; 80 a good animal. Anything below that should be viewed with a cynical eye. If you want to skim the cream from the herd, of course, your score cards from the entire herd should indicate the best animals. It is worth repeating here that the score card is only a straw in the wind. If the cow you want to buy has a production record available, throw your score card away and base your price on the record. Your examination has indicated only what the cow looks like from the outside. Her inside is still as dark as ever.



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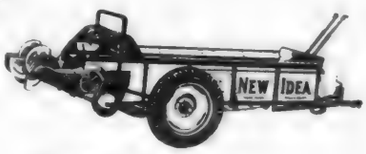

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What Ails My Pigs?

(Continued from page 57)

down. The eyes of the sick pigs are apt to be gummy, and stuck together. Weakness in the hindquarters will be noticed in the early stages, with diarrhea following in five or six days. None of these things are specific for cholera, but a number of them appearing together are good grounds for suspecting the disease.

We say that the cause is a virus, but we must not forget those secondary causes that were mentioned earlier in this article. There have to be such things, or how does the disease suddenly get started in an area where cholera was never known before? The authorities say that the three principal causes of spread are as follows: 1. Feeding of uncooked garbage from other areas. 2. Improper and careless use of virus in vaccination. 3. Importation of pigs that are carrying the disease.

We list cholera as a disease of Big Pigs because pigs that are born of immune mothers are not susceptible to the disease until they are about six weeks old. If the sows are not immune, cholera may kill the Little Pigs as well as the bigger ones.

Septicemia is next on the list. Medical dictionaries say that septicemia is a condition caused by the presence of disease organisms and their poisons in the blood, so the name is a poor one, because many swine diseases cause a septicemia. As it is used here, though, the name is applied to a special kind of septicemia that is caused by a bacterium called *Salmonella choleraesuis*.

The symptoms are very much like cholera. However, several animals may sicken at once, and sudden deaths are common. The sick pigs are more alert, and easier to get out of their nests than pigs sick with cholera. Their eyes are clear, and not gummed. Bowel movements are normal in the beginning, though diarrhea is apt to develop later on. Positive diagnosis is impossible in a herd that is not immune to cholera, for the two are often found together.

Gastro-enteritis is an inflammation of the stomach and intestines believed to be caused by the same bug that causes septicemia. The difference in the two diseases is probably only one of degree; gastro-enteritis is not quite so deadly as septicemia. Symptoms are as already given, except that diarrhea appears a little earlier. The feces are apt to contain mucus and bits of tissue. Diagnosis is limited as in septicemia.

Necrotic enteritis is probably nothing more than a chronic form of gastro-enteritis. It is commonly referred to as the intestinal form of necro, even though it is not generally believed to be caused by the necrophorus organism found in bullnose and sore mouth. The symptoms are pretty much the same as those for gastro-enteritis, but they are usually continued over a period of weeks. An odd feature is the good appetite of affected animals, though they fail to gain much weight. As usual,

other diseases are apt to show up and pitch in on the sick animals. Or it may be that the enteritis is only following a disease that was on the grounds first. Sometimes it is pretty hard to tell which is following what. Diagnosis is a little easier than for gastro-enteritis and septicemia because of the length of time the condition lasts.

Bloody dysentery is another disease of unknown cause. Recent discoveries indicate that it is caused by a vibrio type of bacteria. Again, it may be closely related to necrotic enteritis, and dependent on the same organism. The most striking symptom is a profuse bloody diarrhea. Along with the blood, shreds of tissue may be mixed with the feces. From here on, the symptoms are much like those of the other intestinal diseases we have mentioned. In short, the pigs look sick, act sick, and are sick. The disease spreads faster than a false rumor, and may kill off most of the herd in short order. Diagnosis in the feedlot is almost impossible, although the bloody diarrhea offers grounds for a guess.

The cause of erysipelas, praise be, is known. It's a bug with a jaw-breaker name, *erysipelothrix rhusiopathiose*. It has other names, but the most of them aren't much shorter, and the short ones couldn't be printed, anyway. It is interesting to note that human beings can get this disease, too. The bacteria get into the blood stream through cracks and wounds in the hands of people who are handling the meat of diseased animals. Symptoms aren't as clean-cut as the cause, because the disease appears in many different degrees, all the way from very mild to very deadly. Again, however, there are a few straws in the wind that may help out. Usually, several animals become sick at once, instead of one or two as in cholera. Sudden deaths occur frequently, too. Stiffness and soreness are apt to be the first symptoms noted. The pigs are hard to get out of their nests, the same as in cholera, but after moving around a bit, the soreness is likely to disappear. The sick animals are alert, and not nearly as dopey as cholera pigs. Constipation and diarrhea are seldom seen unless other diseases move in. There may be red spots on the skin, as there often are in cholera. However, the erysipelas spots are apt to turn white when they are pressed, while those of cholera usually remain red. The only definite diagnosis is made in a laboratory, and even then, a negative finding does not prove that erysipelas was not involved.

Influenza is an oddity among swine diseases. It furnishes an example of a virus and a bacterium teaming up to cause a contagious disease. The guilty bug is *Hemophilus suis*, one that is usually found in perfectly healthy pigs. As previously mentioned, the virus is carried by the lungworm larvae, and the earthworm is therefor a help in spreading the disease. Again, symptoms are not very specific, outside of stiffness and soreness as seen in erysipelas. Violent coughing is nearly always a part

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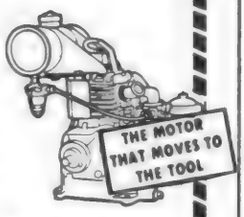

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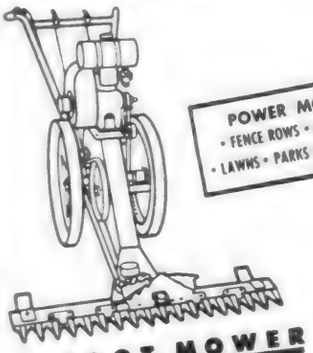

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of the disease picture. Diagnosis, strangely enough, is not very difficult. There are a number of reasons for this. First, the whole herd usually comes down overnight. Second, it appears only in the fall and winter. Third, it only lasts four to six days, and the pigs get well just as suddenly as they sickened. Fourth, there are very few deaths, though the pigs are certainly very sick. Pigs weakened by influenza are suckers for pneumonia, and trouble comes in wholesale lots if it breaks loose at the same time.

That just about sums up the commoner diseases that may affect pigs of various ages. We have not considered treatment for any of them, because that is best recommended by a competent veterinarian on the actual scene of an outbreak. However, there are a few things the swine grower should not do in order to keep the Boogey Man of disease away from his pigs. They are:

1. Don't raise pigs on the same ground year after year.
2. Don't overcrowd them.
3. Don't keep them in dusty or filthy surroundings.
4. Don't keep them in wet, cold, or drafty quarters.
5. Don't feed deficient or poorly balanced rations.
6. Don't be too anxious to bring in purchased stock.
7. Don't keep chronic cases of disease on the farm.
8. Don't let unqualified people vaccinate swine.
9. Don't neglect disinfection after disease outbreaks.
10. Don't be too sure that the pigs have only one disease.

THE MILKING SHORTHORN

(Continued from page 43)

ceives. The market condition at the time of the sale will determine which check is larger. The dual-purpose cow usually has greater salvage value.

For this dual-purpose position the Milking Shorthorn has little or no competition. Bred to fit this picture, with their rugged constitution, they will produce milk and butterfat profitably and at the same time do well as beef. In all cows that are developed for the production of milk there are disappointing milkers, and that applies to all breeds. The difference in cattle is their ability to digest and assimilate food to the best advantage, and much depends on the conditions under which they are kept.

The Shorthorn breeders say that their breed utilizes farm grown feeds and roughage to the best advantage and they need less concentrates to keep up body warmth than the short-haired breeds. This is an important factor in the colder areas. The Borg Farms, Delavan, Wisconsin, disposed

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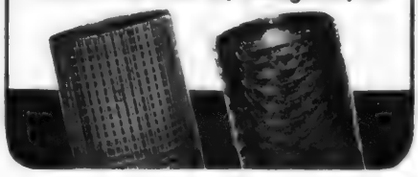

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1948 CATALOG now ready

of its dairy animals and retained its Milking Shorthorns as a concession to cold winters.

The Milking Shorthorn, they say, is bred to balance milk with beef, and needs no disproportional amount of rich concentrate to do her best at producing both milk and beef. That is why Milking Shorthorn breeders say the "middle of the road" course in breeding is the preferred course.

Milking Shorthorns do not require pampering. They do well on good farm roughage, such as silage and hay, when they are not producing. They thrive in the coldest climate, preferring the outdoors even though loafing sheds are provided. There are no authoritative reports on their susceptibility to Bangs, Mastitis, or Tuberculosis. Breeders say, with some conviction, that since they prefer the open air to barns, they are less susceptible to disease of all kinds.

Here's some farmer talk from John Harig of Williamsburg, Ohio, a Milking Shorthorn breeder. He has a 250-acre farm and a herd of 44 animals. He used to be in the construction business.

"I sell young bulls and three-month-old heifers for breeding at $125 to $150 each. We use a bull for breeding purposes because there isn't an artificial breeding service around here, although there is one for the dairy breeds. I like the middle of the road course with Milking Shorthorns. Our average milk production, on the whole year, taking good cows with bad ones, sick animals, bad weather, Mastitis and everything else is 6,000 pounds per cow. The butter fat is 3.9.

"The Association, which is well run, puts a cow on what they call the Record of Merit if, at the age of 30 months, the cow freshens and gives 5,250 lbs. the first year. A cow can also get a Record of Merit rating by giving 8,000 lbs. at four years.

"We breed the Milking Shorthorns at 18 months. Other dairy breeds are bred at 14 months, but the Milking Shorthorns develop later. The bulls are ready at 16 months, but we prefer to hold them until 18 months. We don't trust any bull, but none of ours ever gave us any trouble. They are more tractable, I think.

"A cow that gave 5,250 pounds on her first freshening, and is just about ready to drop a calf, will sell for $350 to $400, easy. A sign on the road mail box sells it. We don't feed supplement except in winter and then only to cows giving better than 25 pounds. We take the poor milkers that don't pay to milk by hand and put two calves under them. A good milker will handle three.

"A steer fattens out to 900 pounds in a year, but won't put on finish as fast or as good as a first rate Hereford. If I were to do it all over again I would either go into beef or stay in the middle of the road, the Milking Shorthorn. They're a good rugged cow."

Boyd Weller, Mason, Ohio, who has been in the Milking Shorthorn business since 1928, says he likes them because they are good milk producers and because he sells his steers at one year old at top prices on the Cincinnati market. They are easy to handle and rugged.

"We have one cow here 15 years old that produced 13,000 pounds of milk last year and 466 pounds of butterfat. She still gives four gallons of milk a day. We keep the steers six weeks on the cow and then put them on Purina calf feed. In 12 and 14 months they will weigh 1,100 pounds.

Twelve of the 17 cows in Weller's herd made the Record of Merit last year. One junior two-year-old heifer produced 7,000 pounds of milk and 250.4 lbs. of butterfat in her first lactation.

The average weight of mature cows is 1,400 pounds; the largest may reach 1,800 pounds. Mature bulls range from 1,800 to 2,000 pounds with a few of the heavier individuals going to 2,500. The heaviest Milking Shorthorn on record was Glenside Roan Clay, owned by E. E. Laffler & Son, Penn Yan, New York. Glenside Roan Clay weighed 3,030. Under ordinary pasture and feedlot conditions, Milking Shorthorn steers will reach 800 pounds at one year of age without forced feeding. Handled cheaply on pasture the second year with a month to six weeks of feed to finish them off, they will make 1,200 pound beeves. Calves are somewhat smaller than those of beef breeds, averaging about 75 pounds.

Longevity

Length of service from cows shows up in the farmer's bank account. Dr. W. L. Gaines, of the Illinois State College of

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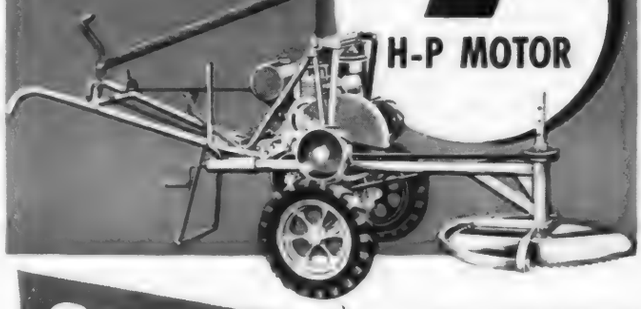

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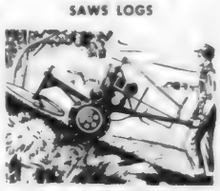

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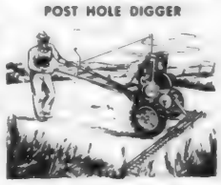

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You can attach or detach most implements in a minute or less. Arrows above show 3-point, triple-quick attachment. Even such a job as changing from mower to cultivator, or cultivator to mower, is easily done in 10 minutes.

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Owners of this new Ford Tractor are finding plenty more to talk about, of course. There's the new 4-speed transmission—four forward speeds and reverse, giving better selection of speeds to fit the work, and faster top speed. There's new, easier steering and improved braking. There's a total of 22 worthwhile advancements, each doing its share to make the new Ford Tractor a *better* tractor—and a better investment for you.

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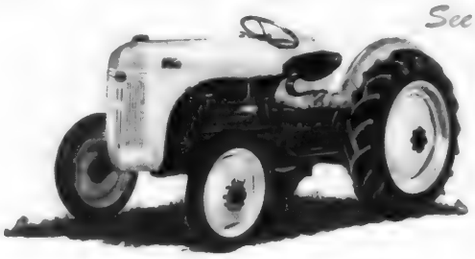

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Maintains uniform depth under varying soil conditions.
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This great new Ford advancement means smoother operation, less wear on tractor and driver, easier, better work. In fields with reasonably smooth surfaces all you do is set the controls once—and uniform working depth of implements is automatically maintained, even when soil conditions vary.

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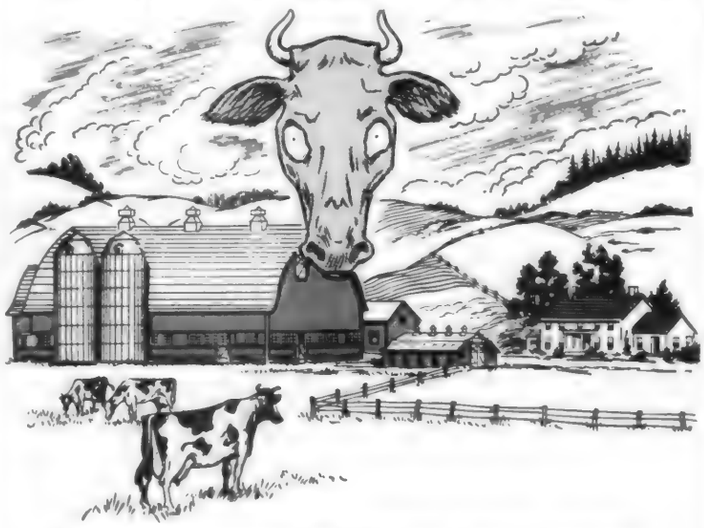

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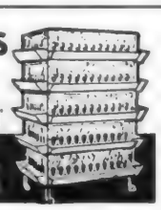

CHEWALLA *Sanitary* BROODER

Agriculture, in his study of all milking breeds based on their records, shows that more Milking Shorthorn cows are at their best at 8 years of age than is the case with other breeds. With the figure given on the life of dairy cattle in the dairies, the average is about four years of production, that is, four calves. Most Milking Shorthorn cows, barring accident, will start producing at 30 months of age and deliver up to 10 years of age profitably. Exceptional cows will produce up to twenty years of age.

The long distance producers are of course the more profitable and the most rare. The rare oddity of a twenty-year-old cow in profitable production is interesting but a cow that can average 10,000 pounds of milk and 400 pounds of butterfat a year for ten consecutive years is truly the sort to find favor with the breeder. Such cows are the herd building material and are all too rare in any breed. Milking Shorthorns claim a proportionate share of these rare and prized animals.

Let's Look at the Record

When Milking Shorthorns are put on test, and pushed to the limit, as all cows are that are in the higher brackets, they have been able to hold their own with the best. They still hold the "World's Butterfat Record" with 1,614 pounds of butterfat produced by Melba 15th of Darbalara, an Australian cow, in 1924. They also hold the best lifetime record on twice a day milking on the cow, Winton Gentle 2d, owned by Messrs J. R. Burges & Sons, Winchester, Hants, England, that produced 223,917 pounds in 15 lactations. She was never milked more than twice a day. Five of her daughters have completed records in excess of 100,000 pounds. She died recently in her 19th year, a few days before she was to drop her 16th calf.

Numerous records in excess of 20,000 pounds of milk in a year prove the inherent ability of the breed to produce. Such records mean little to the average farmer and of course no cow can transmit to her offspring any forced record.

Records on Test

Records on Milking Shorthorns are those made on the cows in testing associations and recorded in the Record of Merit list by the American Milking Shorthorn Society after proper supervision. These testing methods are the same as used by other associations, and they give only an approximate picture of the Milking Shorthorn as a milker. The average yearly production of all breeds milked is estimated at about 4500 pounds, and it is impossible to determine the origin of those not recorded. There are approximately 200,000 Milking Shorthorns registered. The number of grades is estimated at 250,000.

The records on Milking Shorthorn cattle tested show that 21,000 cows produced an average of 9,170 pounds of milk and 363.13 pounds of butterfat. This works out at an average fat percentage of 3.96 per

cent. This is slightly lower than the four per cent generally claimed for the breed. Unlike many tests, this includes the records of all ages of cows from first calves to maturity. The cows over three years old average 9,852.9 pounds of milk, 392.14 pounds of butterfat, or 3.95 per cent, which is perhaps a fairer figure because first calvers pull the average down. Some of these records (not more than five per cent) were made in part on three-time-a-day milking. Ninety-five per cent were made on a twice-a-day milking schedule such as is prevalent on most general farms.

The Milking Shorthorn as Beef

Although the price of milk has been high, many dairymen, or part-time dairymen have had to hold down herds of dairy animals to be able to handle them properly. Some have sold out entirely and gone back, either to beef production or general farming. Labor shortage has been a big factor in the changing picture of dairy farming. The Milking Shorthorn breeder who finds himself unable to continue as a milk producer has an alternative not available to the specialized dairyman. He milks half his herd and handles the other half as a beef herd. He lets the calves milk these cows, two calves to a cow. He can still handle as many cattle and keep up his income. The herd of Milking Shorthorns maintained by the Department of Agriculture at Beltsville, Maryland, when labor conditions became acute, resorted to this practice, and found it worked well. This is farming on a general instead of a specialized plan, and only cattle like Milking Shorthorns are adaptable to it.

Steer calves raised in this manner, compare favorably with the beef breeds. C. C. Lewis & Sons of Point Pleasant, West Virginia, have handled their calves in this manner and find that the added milk puts their baby beeves into condition more rapidly with a minimum of grain, thereby raising better beef more economically.

That breeding for a dual-purpose animal is sound genetically is the opinion of Victor A. Rice, a leading American authority on the art of breeding farm animals. Mr. Rice says: "Dual-purpose cattle selection is not very different from that prevailing in all other classes of livestock, for most breeders try to select for more than one thing at a time. Here we are selecting for two major things at once, milk and beef, and in addition the two things are to some degree antagonistic. We know, therefore, at the start that we will probably never combine both things in their extreme degrees in any one animal. The beef breeds have many genes for beef production and a few for milk production owing to the breeding and selection that has been practiced in the past. The opposite situation, of course, prevails in the dairy breeds. Dual-purpose cattle breeders want about a 50-50 combination of beef and milk genes. Discovering the animals that come closest to having such a genetic make-up by testing and record keeping followed by intelligent

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Mr. H. Lee Leathers, owner and manager of a 320-acre livestock farm near No. Baltimore, Ohio. Mr. Leathers is also secretary of the No. Baltimore Grain Assn.

"Every field on our 320-acre farm is fenced hog tight and we've practiced crop, legume and livestock rotations for many years. The result has been consistently good yields. Some other farms in this area, though, have become poorer and poorer. These farms, without exception, are poorly fenced and little livestock is raised. They are cropping their land to death.

"This is proof to me that good fences and livestock are the keys to successful farming."

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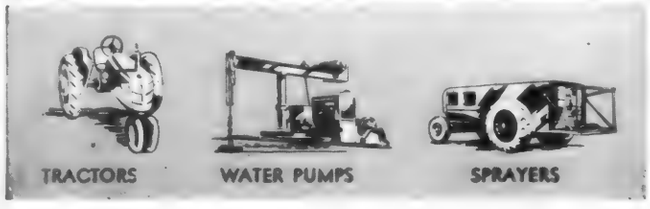

mating and the use of some degree of inbreeding should eventually produce strains of animals that are relatively pure for the qualities desired, although there will always be considerable non-hereditary variation and in the very nature of the case probably more genetic variation than found in comparable situations involving only beef or only milk."

Prices Reasonable But Adequate

Milking Shorthorn breeders have enjoyed a keen demand and good prices for their cattle, but the breed is perhaps less afflicted with inflated values than some of the more specialized breeds. Some top sires and breeding cows have hit four figure values but the average in 1947 for all the state sales throughout the country has been $356.00 per head.

A Word of Opposition

The devotees of a breed are sometimes blind to its faults. In this the Milking Shorthorn fraternity are not guiltless. Let us hear now from C. M. Long, for many years connected with the Holstein Breeders Association.

"The argument," says Long, "that the salvage value of a worn out Milking Shorthorn brings more money is not true. A worn out Holstein cow will bring more dollars than a Milking Shorthorn. The lessened annual milk production of Milking Shorthorns, and misfit heifers, more than offsets the greater salvage value over the smaller dairy breeds."

"Holsteins will utilize 'home-grown' feeds just as efficiently as Milking Shorthorns," Long maintains. "And the reason why Milking Shorthorns produce at advanced ages is because they don't work hard enough to hurt themselves."

With characteristic fairness and restraint, Henry W. Vaughan says of the breed:

"Milking Shorthorns show considerable variation in type, ranging from those of rather extreme dairy form to those of distinctly beefy conformation. Included in the ranks of the breed, however, are a number of excellent herds of true dual-purpose type and character. Lack of persistency in milk flow is rather common. Some are too long of leg and too rangy in form. Flatness of forerib and bareness of shoulder are common faults. However, they are large in size, with straight, level tops, good style and carriage, good quality, and mild dispositions. Many good milkers are found in the breed and some good steers hav been produced by Shorthorn herds of dual-purpose types."

The Farmer's Choice

If a farmer prefers dairying, and can meet the requirements of labor and equipment to go into the business, then there is reason for recommending one of the more specialized dairy breeds for his attention; if he has the feed and range to produce and feed out a herd of beef animals, one of the beef breeds would probably give him the most satisfaction and profit. But if he is the owner of a general farm, the kind of farm that dots the American landscape, 80-100-150 acres then he should give consideration to a breed of cattle that will serve as the most profitable outlet for the general product of his farm. If he has corn to fatten out a few steers, pasture for his calves and four, five or six cows on which his son or the women folk can spend some time profitably, then a dual-purpose breed may be the best moneymaker for him. His choice will no doubt be the Milking Shorthorn, a breed that has shown adaptability and toughness since it was known as the Durham, in our grandfather's time.

HOW TO SAVE ON FARM INCOME TAXES

There are up to 200 items which farmers usually forget to take off on their income tax reports, and which costs them from $25 to $500 more than they would actually need to pay.

These often-forgotten items are listed in one chapter of our "Farmers Income Tax Digest." Other chapters include money-saving, step-by-step ways of figuring your tax on either the Cash or Accrual Basis, Determining Capital Gains and Losses, Setting Up a Depreciation Schedule correctly, and a Sample Tax Schedule correctly filled out.

It is written especially for farmers and applies to all sections of the country and all methods of farming.

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The FOX Forage Master with its three interchangeable harvesting units handles all Forage Crops grown on the farm. It was the first pick-up hay cutter with a grass silage attachment and scored another first when the corn harvesting unit was added.

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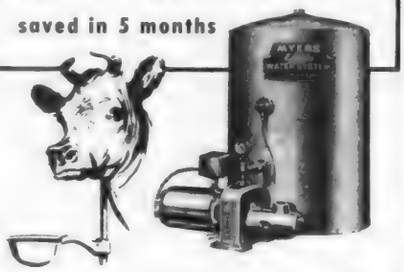
A MYERS OWNER REPORTS — 112 hours saved in 5 months



Milk income from 11 cows was up $36 and 112 hours were saved in first five months' use of running water, reports a new Myers owner. A Myers Water System is *your* best investment. Supplies an abundance of water for all farm and home needs at low cost. Has many patented money-saving features. Complete line of Myers *Ejecto* and Plunger Types assures the right water system for your requirements. See them all now. Mail coupon for dealer's name and catalogs.

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LADINO

(Continued from page 39)

6. It is valuable in soil improvement.
7. It tolerates wetter conditions and poorly drained hardpan soils where alfalfa does not survive.
8. It is injured less by heaving than alfalfa and red clover.
9. It is reestablished from natural reseeding if properly managed.
10. It is highly palatable up to maturity to all livestock.
11. It is among the earliest of the legumes to start growth in the spring.
12. It recovers very rapidly after grazing or mowing when moisture is adequate.

Disadvantages of Ladino Clover

1. It is not productive on droughty soils, during the drier parts of the summer, and in dry growing seasons.
2. It is not sufficiently hardy to withstand severe winter conditions especially when grown on soils of low fertility or if too closely grazed in September and October.
3. Continuous and close grazing decreases production, weakens the plants and may result in summer killing from heat or winter killing from excessive cold.
4. It is hard to cut with the mowing machine because of its heavy, dense, tangled, succulent growth.
5. It is hard to cure because of the high moisture content of the forage.
6. It is susceptible to leafhopper injury.

When it is managed properly Ladino is the kind of clover that will make a farmer willing to leave his best fields in pasture for three or four years.

GO TO GRASS

(Continued from page 73)

Fertilizer Requirements

Corn:
8-8-8 500 lbs. put on when ground is broken.
3-12-12 500 lbs. put on when corn is planted.

Barley:
0-12-12 300 lbs. per acre when seeded in fall.

Oats with Mx. Alfalfa:
0-12-12 500 lbs. at time of seeding.

Sudan Grass:
0-20-0 200 lbs. per acre.

Mx. Alfalfa seeded in August after fertilized barley:
0-12-12 300 lbs. per acre.

Rejuvenated Pasture:
0-12-12 500 lbs. per acre every fifth year.

Oats for pasture:
No fertilizer.

Fences

Electric fences will be used for the new field divisions. In fact, all inside fences

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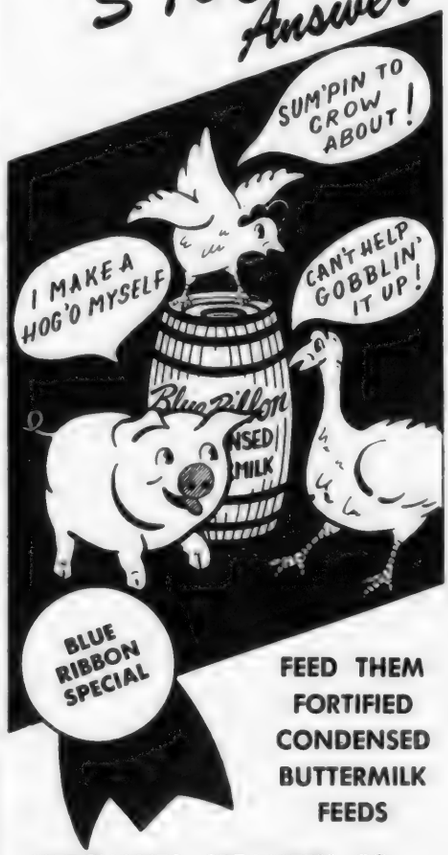

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except those around the rejuvenated pasture and along each side of the creek should be removed and electric fencing used. It saves land, reduces labor in keeping fence rows clean. The electric fence should be placed on a field only when and where needed.

The Grass Machinery

The new machinery which this farmer would need for putting up grass efficiently on the farm, which is a two-man operation, is:

(1) A field hay chopper with a mowing head, cost about $1800. This will chop the hay in the field and blow it into a wagon The chopper and one wagon will be drawn by the tractor. The wagon will be pulled behind the chopper with an offset hitch.

(2) Two new mechanical unloading devices for the wagons to be mounted on his present wagons, cost about $300 apiece. a total of $600. One wagon will be pulled behind the chopper, while the other one is making the trip to the barn to be unloaded.

(3) A corn elevator, cost about $450.00. This will be used to raise the chopped hay into the mow. It will handle large quantities which a mechanical unloader dumps on it. It can also be used for other elevating purposes on the farm.

This new machinery would cost $3000 in round figures, but since he would no longer need his corn planter, picker and silage cutter they could be sold. On today's market they should bring at least $2000. All he would have to do would be to cart them to the nearest neighbor's auction sale. That would make the actual cash outlay about $1000.

With old type hay-making machinery grass farming is harder work than old-time farming. With the new machinery it is easier and quicker. (One Indiana farmer we know put up 20 tons of hay alone, between one o'clock in the afternoon and seven at night. He used a hay chopper, mechanical unloading wagon and a blower to put hay in his barn.)

The Extra Space

To increase the space for handling the additional cows and calves the area of the loafing shed needed to be doubled. For each additional cow 65 square feet of space is needed. (Milking goats require 1/6 this space and sheep 1/8.)

A lean-to shed could be built along the side of the main barn 20x70 feet which would provide the extra space. A 20x30 tool shed should be converted into a calf shed for young and yearling calves.The area over the loafing space could be floored with rough lumber and used for straw storage because the extra loafing area would require double the amount of straw that the farm formerly stored. Some additional space now used for bull quarters, would be opened up if he joined the artificial insemination ring which was operating in his county.

Based on a 40c per cubic foot building cost which was as close an estimate as could be made, the additional loafing space would cost $1800.

The hay mow and silo now on this farm are large enough to hold the needed hay and silage for the increased number of cattle. The corncrib is large enough for all the corn that will have to be bought. The wheat bin will hold the barley.

Increasing the Herd

With the 12 cows and 5 heifers that now made up the herd we figured that in 3 years he could build up to his 34 animal herd unless he had an unusually high percentage of bull calves, or some bad luck with disease. Of course, he could go out and buy extra cows, but to get ones that would compare with those he had he would have to pay at least $400 apiece. The cost of raising the heifers would not be over $200 with the good pastures they would graze on. If he bought cows he ran the risk of exposing his clean herd to Bang's or some other disease. In addition, his pastures would take a couple of years to come into high gear production after rejuvenation, or shifting over from corn ground. So the herd and pastures should come up to peak production at about the same time.

The Grain Feeding Schedule

On the grass program the milking cows will require less grain. Below is a schedule worked out by C. F. Huffman of Michigan State College for fresh and milking cows.

The pasture season is extended 30 to 50 days with the varieties of grass we recommended. That means that in the latitude of this farm the average 160 day pasture season will be extended to 200 days or more. The high producing cow that freshens during the grass season requires very little grain the first week. After the first week we feed her grain according to the schedule below for about six weeks. Then we reduce the grain ration rapidly to the point where her milk starts to decline. At this point we hold her ration; until she is producing 20 pounds or less of milk a day. Then the grain can be eliminated altogether if she is still on good grass. This type of feeding applies to any milk breed, but it will be most successful when carried out by an experienced dairy man.

If the cow freshens at the time of the year when she is not on pasture the schedule as given below applies.

Grain Fed With Good Hay

POUNDS MILK DAILY	Holstein	Ayrshire	Brown Swiss	Shorthorn	Jersey	Guernsey
12	.0	.0	.0	.0	1.0	1.0
16	1.0	1.0	1.0	1.0	2.0	2.0
20	1.0	2.0	2.0	2.0	4.0	4.0
24	2.0	4.0	4.0	4.0	6.0	6.0
28	4.0	5.0	5.0	5.0	8.0	8.0
32	6.0	7.0	7.0	7.0	10.0	10.0
36	7.0	8.0	8.0	8.0	12.0	12.0
40	8.5	10.0	10.0	10.0	14.0	14.0
44	10.0	12.0	12.0	12.0	16.0	16.0
48	12.0	14.0	14.0	14.0	17.0	17.0
52	13.5	16.0	16.0	16.0	18.0	18.0

Dry cows, and heifers over six months of age require very little grain, none if they are on good grass. Six to eight pounds a month will keep them in good flesh on good hay; they get ample proteins, minerals and vitamins.

How Much Time?

Handling the hay will be by gravity drop into the bunker below the mow. The grain will come down a chute as it does now. Legume silage for the extra cows will take more time to unload, twice as much time in the silo, in fact, but it will only take one trip up and down the ladder. Based on complete time studies made in dairy barns the additional 11 milking cows should add not more than 30 to 40 minutes to the milking time morning and evening, for preparation of the milking machine and the clean-up afterward will take no longer. Only the feeding and the milking time will increase. Labor is approximately one-half of the cost in a dairy and this will be a main item of expense in this man's grass program. Since the farmer will not need to be in the field as much he can afford to take more of his time in the dairy. His saving in time in not growing corn will amount to 9½ hours per acre.

His field labor costs using the machinery and method outlined will require one-third less labor which will enable him to carry more than twice the number of cows, with no additional labor.

How Much Money*

This farmer's income on the old program was $3,600.00 from milk from his 9 cows. From the 1,683 bushels of corn he sold he received $2,520.00 He spent $160.00 on protein supplement and $40.00 for a ton of fertilizer. Roughly his gross was $5,920.00. On the new program he would receive $9,600.00 for milk from 24 cows. He would have to buy 513 bushels of corn at about $770.00 and 10,860 pounds of protein supplement at $450.00. His fertilizer cost would be $180.00 for 4½ tons or a rough gross of $8,200 on the grass farming operation.

*All figures based on these average prices: corn $1.50 a bu., Golden Guernsey milk $5.00 hundred for 4.5% milk. The average production for the cows was 8,000 lbs. of 4.5% milk.

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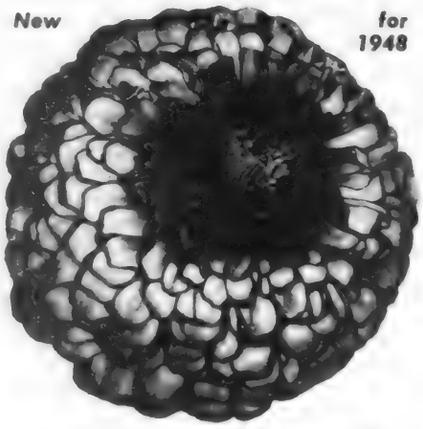

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THE FEEDERS' SILENT PARTNER — TUXEDO FEEDS

Corn or Grass?

Why should a farmer with good land go into a grass program? The 500 acre farm of Otis Wall in the heart of the black Indiana corn ground gives one man's answer. Wall is a confirmed grass farmer in the midst of corn farms on all sides of him near Advance, Indiana. The first week in June two visitors were walking through one of Wall's 20-acre fields where the clover was about eight inches high. The surface was as smooth as if a lawn mower had been run over it and the field was almost white with blossoms. Wall casually remarked, "About three or four days ago I took the sheep off this field to let it grow up a little for the cattle." Wall went on to say that he had pasured 600 sheep on the 20 acres. To the question, "For how long?" he answered, "60 days."

Thin ewes like Wall uses will gain one-tenth of a pound per day on good grass.

MOVABLE BUILDINGS on the I. C. Elston farm near Crawfordsville, Indiana. The tractor loader makes a good tool for skidding them about the farm, placing them where the manure is needed for rebuilding soil.

That would be a gain of 60 pounds a day off 20 acres, or 1,800 pounds in a month. Last spring mutton was worth 18 cents a pound. This gave a return of a little over sixteen dollars per month per acre for pasture.

This field was typical of all the fields on the farm. Its condition was typical of the way Wall manages his grass. He does not let it become short as most farmers do. He realizes that grass must be fed through the leaves and if the stems and leaves are eaten off there is no way for the grass to grow rapidly. This field was typical of Wall's management in another way. He said that last fall he put on 400 pounds of 0-12-12 fertilizer per acre. When he was then asked if he had fertilized it previous to that, he said that for each year the last five years he had applied fertilizer at the same rate. The field had been seeded to oats as a nurse crop five years previous. This amounted to a ton of 0-12-12 fertilizer in the five year period, which cost him at that time about $35.00, or seven dollars per year. When one of the men asked him if he didn't think that was an expensive practice he said, "Hell, look at what I got off of it and see if you think it was expensive. My banker doesn't."

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"SCHAFLER SELLS SADDLERY"
WEST COPAKE 38, NEW YORK

Wall was offered $75.00 per acre cash rent if he would put his fields in seed corn for one of the hybrid seed corn companies. All he would have to do would be prepare the field, plant it, and tend the crop. They would furnish the fertilizer and seed corn and do the harvesting. He said he could not afford it. In the light of the returns given above, you can see that he was right.

Wall is one of the most successful farmers in the state of Indiana. In the last six or seven years he has never put any kind of a crop in a crib or bin. When he sows small grain as a nurse crop it is pastured with sheep or cattle. When he plants corn it is never taken off the fields. He begins cutting it in the dough stage with a field ensilage cutter and feeds it to cattle. It is all fed by the time it would normally be too hard for silage. In this way he is getting all of the fertilizer produced by his crops returned to the field on which it is produced.

It is hard to believe that such heavy applications of fertilizer will pay on land as good as this farm, for it is made up mostly of one of the best types of soil to be found in the state. It is even harder to believe the number of livestock per acre the farm will carry unless you see them grazing. In a year's time he will feed close to 20,000 sheep and 200 cattle for the market.

Why the Wry Look?

The cash crop farmer may smile when we say that as much money can be made off pastures as with corn or other grains. He is skeptical because he has not had the opportunity to see what can be done with a modern "super-pasture." This point is proved by the records kept by nearly a thousand farmers cooperating with Purdue University. These records covering the last 10 years show that their average income from pastures is in the neighborhood of $5 to $7 per year. These pastures are the ordinary pastures found in the corn belt.

What's wrong with these pastures? Usually there are a number of basic mistakes that are made: (1) the poorest land is often put in pasture with the erroneous idea that pasture alone will build it up. (2) If the pasture is in bluegrass or timothy alone the nitrogen in the soil is being depleted. (3) The pasture is improperly grazed, by

(a) Pasturing too early in the spring.
(b) Pasturing too close during the season.
(c) Pasturing too late in the fall.

(4) The pastures were not properly limed and fertilied. (5) The animals were not rotated from field to field.

What Soil Should Be In Grass?

Even the most ardent grass farmer will not advocate that all land be put in grass in order to maintain its fertility. The decision depends mainly on the slope of the soil.

A simple rule for grass farming is, if the land doesn't erode, raise corn. If there is slight erosion reduce the corn. If there is excessive erosion eliminate all the corn and raise all grass.

CRANBERRIES

(Continued from page 97)

not follow this practice generally, as the bulk of their fruit goes to canneries which sort them.

Cranberries were first sold entirely as fresh fruit for the few months from the beginning of harvest in mid-September through Thanksgiving and Christmas holidays. Shortly after the turn of the century when production soared nationally to over 69,000,000 pounds annually the marketing season was extended.

About this time, and largely through the efforts of Marcus Libby Urann, a young Boston attorney turned cranberry grower, the longer marketing season was made possible. Urann began to put up cranberries in cans in 1910. Two years later he set up his own canning company and his pioneering work has resulted in making canned cranberries a delightful year-round food.

Scratch another daily time-wasting chore off your list! Now, keep stock tanks ice-free all winter long—and NEVER LOOK AT THE HEATER! You can do it with the Hudson Lektrik-Heet Stock Tank Heater. Put one in the tank now. The thermostat automatically keeps water at desired temperature. No re-fueling—uses electricity only as needed—no waste, low cost. Hudson Lektrik-Heet fits any stock tank. It's tested and proved in severest climates. Buy yours now at your nearby Hudson dealer—remember the name: Hudson Lektrik-Heet.

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† Excerpts from letters of users.

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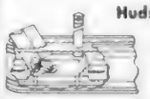

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Extensive research to increase the popularity of the fruit is supported by the industry. Chemists have shown that cranberries contain 13 minerals and vitamins including such important ones as iron, iodine, calcium, phosphorus and vitamins A and C.

Besides the sauce, the Cranberry Association markets a juice, "Ocean Spray," which is the pure extract of vine ripened cranberries with just enough sugar and water added to mellow the flavor.

Cranberry sauce, the mainstay of the canned product, contains all the fruit except skins and seeds. A puree is cooked with sugar until it reaches the jelly stage, then is firmly molded so it can be served in slices or fancy shapes out of the can.

Not to be outdone by other food processors, cranberry growers are finding important ways to use even the skins and seeds. Extensive research undertaken by the late Walter A. Nealy and associates for Cranberry Canners, Inc., found skins and seeds contain crude Ursolic acid—an excellent emulsifying agent for cold creams, cosmetics, toilet powders, salad dressing, and many other uses. As far as Nealy could learn there never had been enough Ursolic acid avilable to even make it an article of commerce.

Not long ago it was found that the waxlike coating on the skins of cranberries can be made into a glossy wax ideal for protective coatings for woods, metals, and papers. This wax is extremely water-resistant.

Another cream called "Vaccinol," prepared from cranberry seed oil, Ursolic acid, and distilled water has proven valuable in treating and curing burns and eczema. The Ursolic acid also is used to put more gloss on cellulose lacquers, and likewise makes an edible, non-toxic product now being tried out by large food and cosmetic manufacturers.

Less than a decade ago, good peat land in the West was selling for only $100 an acre and buvers were hard to find even at that price. Recently one seven-acre, newly-built bog sold for $45,000, while another three-acre tract with a small cabin and a few storage sheds brought the owner $20,000. Cranberries have become a tasty dish for gourmets and farmers alike.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC. OF THE FARM QUARTERLY

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(Signed) Aron M. Mathieu
(Signed) Clifford Laemmle

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FARM QUARTERLY WRITERS

RICHARD E. STOCKWELL, who writes about flax in this issue, left his father's dairy and poultry farm to study agriculture at the University of Wisconsin. He was graduated in 1940 and began to accumulate experience as a farm radio editor. At present he is editorial writer on the Minneapolis *Star Tribune*. It was here, in the center of the flax producing area, that he became interested in the crop and began to follow it closely.

Dr. A. C. Dillman, who was in charge of a flax project for the U. S. D. A., helped Mr. Stockwell in preparing the article. Frank Hagenbuch and C. M. Manchester, both flax farmers, and A. J. Kent, Manager of Linseed Meal and Oil Paint Division of The Sherwin-Williams Company, supplied information and suggestions.

HAYDN PEARSON, author of "Winter on the Farm," was born on a New Hampshire farm and now owns a farm in Massachusetts. Of his five published books, perhaps best known is "Country Flavor." FARM QUARTERLY readers will remember Mr. Pearson for the Yankee Farmer article in the Winter 1946 issue.

DR. B. J. KILLHAM, author of "Lump Jaw," Page 52, once considered studying either dentistry or medicine. He decided, however, that his name might be misunderstood by patients and entered the field of veterinary medicine. After graduation in 1912, he practiced in Iowa for several years before joining the Federal Bureau of Animal industry. In 1921 he was appointed State Veterinarian for the State of Michigan. He resigned in 1930 and accepted a position as Extension Veterinarian with the Michigan State College, where he teaches classes in veterinary medicine. He has considered forming a partnership with a friend named Ketchum. "What a killing we would make," he says, "Ketchum and Killham!"

DR. A. G. CHAPMAN, who wrote, "Lumber When You Need It," Page 44, is Chief, Division of Forest Management Research at the Central States Forest Research Station, Columbus, Ohio. Giving the preparation of this article the benefit of their experience were also Dr. O. D. Diller and Mr. Frank Needham of the Ohio Division of Forestry.

JACK BAILEY, who wrote "What Ails My Pigs," Page 18, will be remembered for his Mastitis article in the Summer 1947 issue. He grew up on a dairy farm in Wisconsin and before becoming a veterinary doctor was a herdsman for several years.

RICHARD C. BELL makes his first appearence in this issue of FARM QUARTERLY with his article on Cranberries on Page 94. Mr. Bell lives in the state of Washington, where he knows cranberry farming first hand. He was for three years acting extension editor at the Washington State College, and at present he edits a small farm magazine in Seattle. Mr. Bell's cranberry article was approved by growers of the American Cranberry Association on both the West and East Coast.

EVART VANDER MEULEN grew some of the first acreages of Ladino clover in Michigan and has followed the plant's progress closely since then. At present, he is in charge of field seed research with the Corneli Seed Company.

MRS. MARIE ARMSTRONG ESSIPOFF owns, with her husband, a farm near Terryville, New York, where they specialize in Pilgrim Geese of which she writes on Page 74. Aiding them with the chores are their four boys which could be a big help on any farm in these days of labor shortages. E. L. Dakan, a poultry expert at Ohio State University whose name has appeared often in FARM QUARTERLY, followed this article from manuscript into type.

C. M. LONG, who wrote "Go to Grass," page 68, is an authority on grass farming. He graduated from the University of Missouri and was a county agent for several years. He was later a field man for the Holstein Breeder's Association, and now has his own firm, the Farm Clinic, with headquarters at Lafayette, Indiana. He has analyzed thousands of acres of midwest land.

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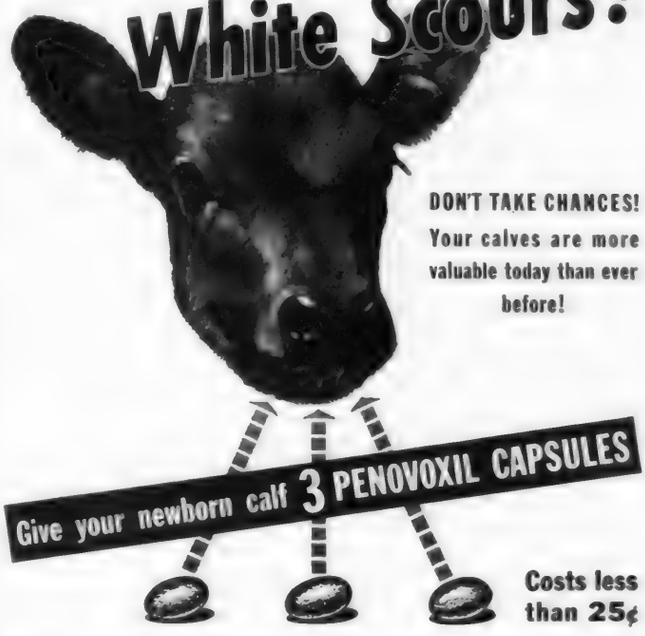

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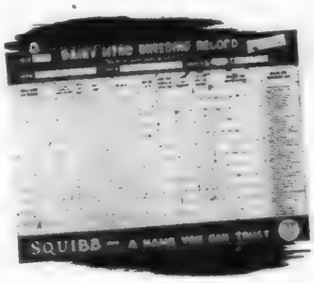

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THE PROMISED LAND

(Continued from page 67)

milk by truck to Palmer. From there it goes to Anchorage for pasturization. They receive $7.70 a hundred pounds for 4% milk, during the winter an extra dollar per hundred pounds is paid to encourage dairying.

Lamb meat is of excellent flavor and the wool is of high quality. Sheep are particularly fond of the common annual weed, lambs' quarters, and do an excellent job of cleaning up any waste grain or hay left in the fields. Lambs marketed directly off the range and weighing about 40 pounds dressed are much in demand at good prices. Hampshire and Columbia breeds predominate. The cattle are mostly Guernsey and Holstein with a few Shorthorn and Hereford.

Why Go?

Considering all the things that a man may do with his life, why should he leave a home and familiar surroundings to go to a raw, frozen, mostly wet land? Here's the way G. I. Veteran, Charley Gelch, put it:

"As a boy I was twelve years on a farm and I liked every bit of it. I am going to Matanuska Valley to live because I want a fresh start, because I don't know any place else in the world where, for $5,000 I can be my own boss and have good land and equipment that I can call my own.

"Sure, I know it's dark in winter, but it's darker in Gary, Indiana, rolling steel."

The kind of immigrants that the Government men want to dissuade can be guessed at by this portion of a letter written by I. M. C. Anderson, Principal Area Supervisor, Farmers Home Administration, Anchorage, Alaska.

"We in Alaska who are interested in agriculture are having our hands full with the new settlers coming North. It seems that we have been over-advertised in the States. People are quite sure that they can pick up gold nuggets in the streets and move on to a homestead with electric lights and all the plumbing already installed. When they find their homestead several miles from a highway and the only way they can arrive there is by boat or dogteam, many of them are discouraged.

"Out of the many that are coming, few are digging in. Those that can get along without modern conveniences will probably develop Alaska, but it is going to be tough sledding for those with little pioneering spirit or experience.

"The country must depend upon its own resources if it is to succeed."

How to Buy a Matanuska Farm

Don L. Irwin, Director of the Agricultural Experiment Station, at Palmer, Alaska, sets out these means of how farms can be acquired:

"(1) When a farm becomes vacant the Alaska Rural Rehabilitation Corporation will sell it to a desirable family who plan to make a home and to farm it. A farm of 80 to 160 acres can be purchased at prices

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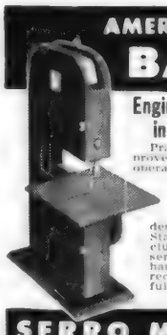

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The sheriff of Palmer, Alaska packs a gun where all can see it.

ranging from about $4,500 to $6,000. Cash payment may be made for entire amount or terms may be arranged for ¼ down payment, the balance to be paid within 10 to 15 years at 3% annual interest on the unpaid balance. Most farms have from 20 to 40 acres of cleared land and the buildings include a large barn, 5 to 7 room house, chicken house, well and wellhouse, and frequently additional small buildings.

"(2) From private owners, usually farmers. Purchase can be made occasionally of farms fully equipped with furnaces, electric lights and water; barns with cement floors, stanchions, drinking cups, and electric power. Many farms have silos, modern milk houses and well-equipped poultry houses.

"(3) By purchase of undeveloped Government land at a price ranging from $1.25 to $5.00 per acre. This land is usually covered with birch-spruce forest and must be cleared before it can be farmed. To clear five acres is a season's job, even with a rented bulldozer; and to level these acres down by ploughing and discing is the work of a second season."

At present there is not sufficient machinery in the Valley to supply the needs of the people now farming. There are 75 or more farm tractors and there is much exchanging of work and machinery. Most of the farmers want to own a tractor, truck (1½-ton capacity is a good farm size), plow, cultipacker, grain drill, grain binder, and for potatoes a planter and a digger. There are three or four threshing machines in the Valley; the ARRC has a good seed cleaner (fanning mill), and a few farmers have ensilage cutters.

Very little new farm machinery is for sale in the Valley and that goes to "old friends first."

It is best to visit the Valley and make a thorough inspection before making plans to move in.

Many organizations have been started in the Valley, such as 4-H Clubs, Red

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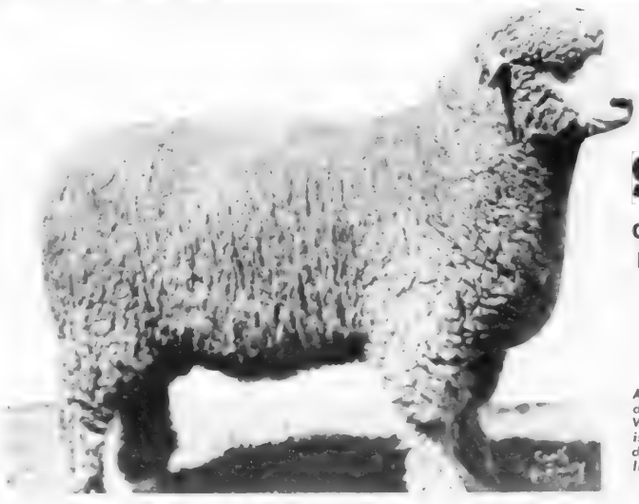

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Corriedale Ram, 52-B
Heads Famous Flock

Owners,
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Another outstanding Corriedale Ram owned by the Walkers of Gambier, Ohio, is W-124 shown here, never defeated as a lamb, yearling or 2-year-old.

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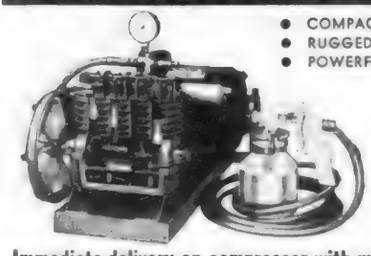

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Cross Chapter, Parent Teachers' Association, the Matanuska Valley Farmers Cooperating Association, the American Legion, Masons. The churches represented in Palmer are the United Protestant, Lutheran, Catholic, Seventh Day Adventist, and Matanuska Valley Mission. There are four Jewish families.

Even the sourdoughs say that at the start, Matanuska Valley could only be settled by Government help. Whatever the costs, the mistakes, and the anguish of settlers who suffered from early bureaucratic inefficiency, the days of free lunch are past, and the Valley is on its own. Santa Claus doesn't live here any more. Government work is devoted to research on soil, weather, and crops. "There is less Government interference in the Valley, than any place Outside," says Elsie Jeffers, acting editor of the *Valley Settler.*

Who Are the People?

In the Valley, as in every community, there is a king, a man who by common consent reigns as the patriarch and benefactor to the people of the Valley. The visitor won't be long in Palmer before he hears of "M. D."—M. D. Snodgrass; that is, an old-timer who came in almost fifty years ago. He was in charge of the agricultural experiment station at Kodiak when Mount Katmai erupted in 1912 and covered Kodiak with 18 inches of ashes and sand. He located the Matanuska Agricultural Experiment Station in 1915 and was the agricultural colonization agent with the Alaska Railroad, until 1933. He and his son have 160 acres. At one time he owned most of the land on which the town of Palmer is now located and has naturally fallen into the position of being the Valley's largest real estate salesman. He is active in all civic affairs, and is consultant on any and all miscellaneous matters. "See M. D." is a Matanuska byword.

You are strictly on your own here, for family means nothing, nor the car you drive, nor the church you attend—if any. Not long ago a truck driver asked the lady of the house if he could see the new farm owner, and asked her what her name was. "Mrs. Clark," she said "Hell," he said, "I didn't ask what tribe you belonged to. What's *your* name?" And so it is. People who have been mistered all their lives are sometimes delighted, and often find it easy to slip into the easy informality that marks our days.

The law is represented by U. S. Marshall, Bill Bouwens, one of the original colonists. He owns a 40-acre general farm where his wife and 11 children live, but he has his headquarters in Palmer, 2½ miles from his farm. He was in the Sheriff's office in Rhinelander, Wisconsin, but he came to Alaska to be a farmer. In early days there were few experienced policemen and his present job was gradually wished on him because of his experience. He says the old-timers cause the least trouble. It is the new people who kick up

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Stamping name and address on any quantity ear tags, $1.50
OTHER PRICES ON REQUEST — SEND FOR CIRCULAR

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Order your Son of a Superior Sire daughter today.

Biltmore Farms
Biltmore (Asheville), North Carolina

The snow covered mountains overlook everything: farmers planting potatoes, planes bringing in supplies, and children playing the same way they do everywhere.

the fuss. "This is a drinking country," he says. Lawbreaking is a Federal offense unless within city limits. Among the townspeople, Bill has the reputation of steering clear of anything that looks like work. His friends say he even gets an Indian to do his fishing for him.

Typical of Matanuska's successful farmers is pioneer Max Sherrod, a stocky, scholarly, modern pioneer, who lives with his wife and one child in a modern home on the outskirts of Palmer. He is well-satisfied with his present lot, and enthusiastic about the future of the Valley.

The Sherrod farm house is clean, modern, and well-equipped. It was built for comfortable living as much as for utility. Near it stands a converted Quonset hut used as a vegetable room, a greenhouse, and a log cabin "summer house" to accommodate visitors.

Mrs. Sherrod says: "This is the place where seed catalog illustrations are not misleading. We get short-changed only in fragrance, for odor seems to be quite faint in all but the most highly scented flowers of the Outside."

Her garden, large and lush, unreels before the home. It is filled with peas, beans, cabbages, cauliflower, strawberries, and celery and bordered with flaming flower beds. Mrs. Sherrod's flowers are the pride of the Valley—where blossoms a quarter or half again as large as those in the States are ordinary—and they find as ready a market in Anchorage as do her husband's vegetables. Sherrod has two other growing plots. One, dense with cabbages, stretches 400 yards from one side of the house. The second, located a mile away, is a field of rich river lam sloping toward the Knik. It is lined with block-long rows of potatoes, carrots and beets.

Visit Max Sherrod in July, and you'll find his cabbages already the side of volley-balls. "They're getting a nice start," Sherrod will comment. "A few will go to

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EXCLUSIVE TRADE MARK REG U S PAT OFF

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SAVE you
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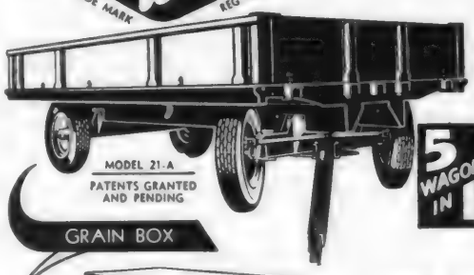
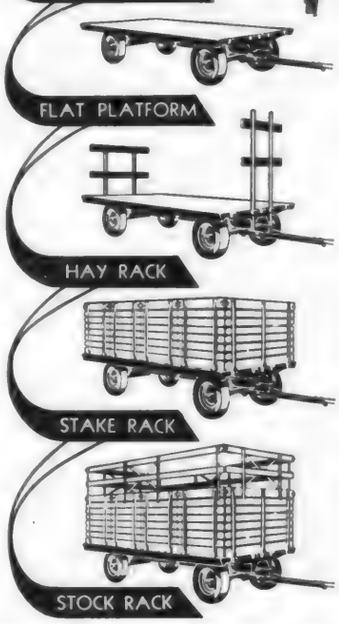


5 WAGONS IN 1

You buy this unit with Flat Platform on which you easily attach our steel Grain-Tight Box, Hay Rack, Stake Rack, and Stock Rack assemblies.



Sturdy Understructure—
Made of tough Hi-Tensile steel. Sills and bolsters flex to absorb the shocks of cross-field hauling. All parts welded together to form a rugged unit.

Unusual Strength, Capacity and Size—
Handles a payload of 3 tons. Grain Box holds 100 bushels--and it is grain-tight. Platform area is 7 ft. x 14 ft.; tongue-and-grooved floorboards.

Easy to Load and Unload—
Only 31½" from ground to floor.

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Wheels have heavy tapered roller bearings and 6.50x16 six-ply tires. Automotive-type steering--no "whipping" at fast speeds--no tipping on short turns. Tractor and truck hitch or horse pole attachment.

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The most practical units in the world for farms and ranches

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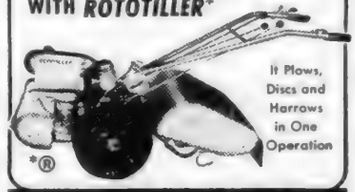

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35 pounds, but 7 to 10 pounds is the way I like them. I've been trying for a 50-pound cabbage ever since I got here, just for the hell of it, but haven't made it yet."

John Buggy is an old-timer, the first man known in this area. He came in with the gold stampede and "squatted" in the Valley in 1914 in a log, sod-roofed shack. Buggy kept open house for any travellers in the Valley and on winter nights would often crowd twelve and their dogs in his one room, around his red hot wood stove. At one time he owned 360 acres which has dwindled to 120 acres, adjoining the city limits of Palmer. He used to farm extensively and raised sheep and cattle, but he says he is too old now and has sold off about everything. He is a bachelor, well-read, and a staunch Republican. He thinks it was smart for the Government to send the colonists and build the roads and schools. The town people swear by John and neighbor women borrow his can opener and the men his tools.

Frank Balogh and his wife are newcomers. Frank is 34, Mrs. Balogh is 33, and they have two children, Mary 8, and Michael, 10. They came to the Valley in April 1947 from a farm in Pierpont, Ohio. They had been on the Ohio farm for a year and before that Frank was with General Motors. They have 80 acres in the Valley which they are now clearing. They say they wanted to get away from the Ohio weather and find "true freedom." Frank intends to truck farm at first and then gradually work into a large greenhouse operation as he is sold on greenhouses for Alaska. They have no electricity. Their water supply is an icy mountain stream a few yards from the door.

Frank says, "Hell, we have all the conveniences. The Palmer school bus picks the kids up in the morning, drops them off at night. We get our mail and supplies at the Co-op in Palmer (five miles away). We have applied for REA electricity and should have it within a year. But the biggest convenience is Pioneer Peak, seen from anywhere in the Valley. By God, we know where home is."

Inside of Palmer, Alaska

In upper government circles, Matanuska Valley is spoken of in terms of cattle production in 1970, and news is asked about the possibility of getting seed of the yellow flowered Siberian alfalfa. But in Palmer itself, no one worries about how many cattle will range the hills in 1970, or whether in five years a USDA scientist will announce to a breathless Section Chief: "Plot 2-A, growing hay on Experiment 9856, has produced on the basis of 1/12 acre, hay equal to two tons to the acre that can be pastured to two inches, mowed twice, and will not winter kill, it is believed."

The conflict in Palmer is much more earthy. It deals with the ancient town and gown division. In Palmer, these divisions are the Farmer's Cooperative owned by a group of farmers who bought it from the

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Life size model of an Alaska pioneer, standing in the parlor of his home.

federal government and those farmers who are not members. Railroad tracks which divide the town in two, also divide the Co-op side of the town from the independent side.

The Co-op collects the farmer's crops and markets them to the Army, to private stores in Anchorage, and to nearby logging and mining camps. Two nights a week it operates a movie in the gymnasium of the school. It sells staple foods, hardware, dry goods, maintains a garage, sells a complete line of farm, seed and household equipment. In 1946 it did a gross business of $1,060,000 and the estimate for 1947 is $1,500,000. The Co-op owners feel the rest of the town is riding on its tail as it carries all civic functions. The attitude of the rest of the town is illustrated by the man across the tracks who built a movie. When this movie opened he came to the manager of the Co-op and said, "Well, now my movie is opened you can close yours." He was quite vexed when the Co-op refused.

Across the railroad tracks competition to the Co-op grocery department is Koslosky's grocery store. It is comparable to a first class chain store Outside. Prices in Palmer reflect the shipping mark-up as well as the general scarcity of goods. Bread is 23c a loaf, lettuce 80c a head (on June 1st), butter $1.40 a pound, 10 pounds of white sugar $1.75, a dozen eggs $1.30, a quart of milk 30c, a can of Dutch Cleanser 15c, five lbs. of white flour 83c.

Marvin Allyn, General Manager of the Co-op had this to say about marketing farm crops to the Army. Any G. I. will recognize Mr. Allyn's symptoms.

"One week the Army may purchase ice cream and the next week they decide to freeze their own and to purchase mix. Then they 'discover' several tons of prepared mix powder in their warehouse and eliminate all purchasing locally. They purchase fresh fluid milk for a time and then a new administration may decide to ship in frozen milk.

"We look forward to developing other

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Catalog and full information sent upon your request

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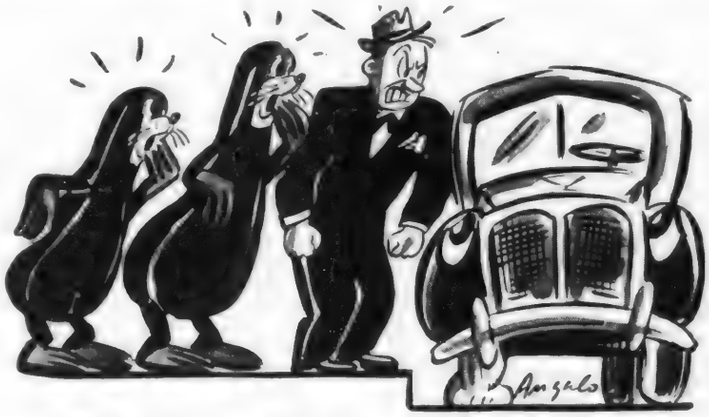

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Ever had a tire "let you down" at the wrong time? Perhaps it ran underinflated too long.

Check *both* seals on your tire valves today. Worn out cores and missing valve caps let air escape. Replace them yourself or have your dealer do it. Be sure a Schrader Sealing Valve Cap is on every tire valve. Yes, these *two* seals, working together, really make your tires last longer.

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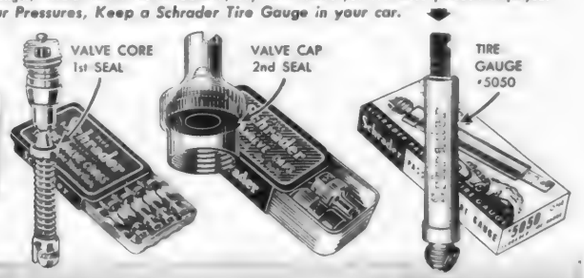

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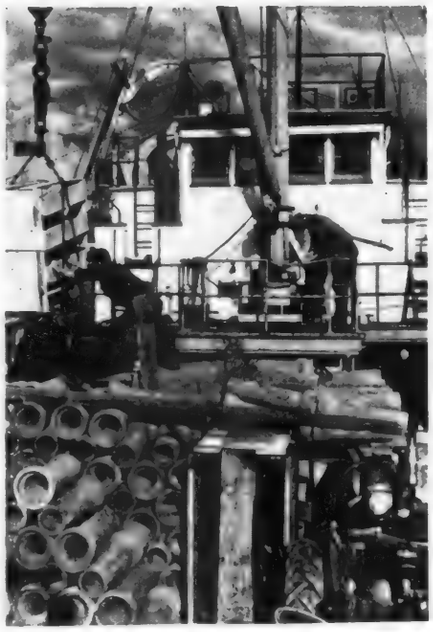

The deck of a ship arriving at Anchorage. Almost all supplies are lugged by boat, by plane or by motor car over several thousand miles to reach Matanuska.

markets and thereby escape Army uncertainties."

Vic Nielsen owns the Frontier Liquor store, and has been in the Valley two years. Vic says, "I would pay $10,000 a year rent for that Co-op store and they are running in the red now. There are three other liquor stores in Palmer but Vic gets most of the trade.

Some of the wives of the Co-op farmers look on Vic Nielsen after the manner of the ladies of our own West who sauntered into the saloons with axes and got busy. Others think he is a red-hot business man, the kind the town needs. There's plenty of life in Palmer whether the sun sets at noon or at midnight.

The American Way

Just yesterday, if we look on time as the history of nations is written, our nation was developed by pioneers who left home base with an ox, an axe, and a bag of beans. Matanuska Valley is a 20th Century frontier with settlers arriving by plane, and ordering machinery and livestock by air express. The womenfolk can walk into town and get their hair curled at $12.50 for a machineless, and $15.00 for a creme oil permanent at the Kut and Kurl Beauty Shop. Lou Rasmussen says: "I've been running a beauty shop here for eight years and serve the same customers every year. Our jobs aren't frizzy."

Yes, it's a 20th Century frontier, all right, but the pioneer with the axe, the ox, and the bag of beans would feel right at home. For he's the man who did it once before, and he's the only kind of man who can do it again.

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LETTERS

(Continued from page 12)

growing not only in water or sand, but in soil as well.

In the experiments conducted, as I mentioned earlier in this article, by the Department of Agricultural Research of the *Canadian Radium & Uranium Corporation* of New York, on our experimental farm not far from the city of New York, we used alpha-radioactive compounds equivalent in radioactivity to Uranium Oxide U_3O_8. We used, for the purposes of our experiments, nine garden plots, 25 feet by 75 feet, with a free space of 6½ feet between each tract. On each plot, a different combination of fertilizer was used, so that the results could be indicative of the productivity of the respective formulae. The entire area, 24,200 square feet, was tested for potential nitrogen and accurately graded. This ground had not been used for vegetation in the previous four years, at which time it had been treated with lime. Crops of hay had been the only produce of this area.

After plowing the whole plot, 231 kilograms of 20% superphosphate were applied in the following manner:

(1) placing the phosphate in a small fertilizer spreader, and (2) spreading it evenly over the surface of the area. Then, the ground was thoroughly harrowed in a lengthwise and crosswise direction, from east to west and from north to south, to insure deep penetration of the superphosphate into the soil.

We decided to employ three distinct combinations or dosages of the ingredients and specifications, according to formulae worked out by the distinguished scientists, Dr. Ladislas Goldstein and Professor Francis Perrin, in association with the writer. Three of the nine plots were not radioactivated and were used as checks for the purposes of the project.

Crops used on our farm consisted of cabbage (Early Wakefield and Copenhagen), leaf lettuce, radishes, carrots, peppers, tomatoes, beans, peas, and cauliflowers. Planting was started on May 21, 1943, and continued for seven days. Although this is a late date for planting under ordinary conditions, weather conditions that year were most favorable, light rain and sunshine prevailing during early June. Care was exercised to plant each variety of vegetable at the same time, so that results would be comparative for equal periods of growth. Each plot was known by numbers and received similar cultivation and attention.

Radioactive compounds were used in combination either with commercial fertilizers or with dehydrated cow manure. Mixtures containing fertilizer were applied by using the same machine as in spreading the superphosphate. The manure mixtures were applied evenly and uniformly from buckets containing 2 kilograms of the particular formula. Thereupon, each plot was harrowed in just one direction, from north to south, after which planting was started, as indicated before.

Our experiments established the premise—confirmed by similar experiments in other countries—that weak additions of alpha-radioactive compounds to an active fertilizing agent, organic or inorganic, not only brought plants to earlier maturity but, in all but one instance, produced a greater crop yield. The increase in weight ranged from 13% per vine in the case of beans treated with a mixture of inorganic fertilizer and radioactive compound, to 53% per planted area in the case of leaf lettuce treated with a mixture of organic fertilizer and radioactive compound.

Further experiments, conducted on another of our test farms as recently as in the winter of 1946-1947, when greenhouse tomato crops were used for testing, showed a 23% increase in the weight of tomatoes and a 19% increase in the yield per plant. Moreover, the ripening time was shortened by two weeks.

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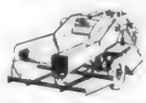
☐ POTATO HARVESTER

☐ SIZZ-WEEDER*

☐ COMBINATION SAW

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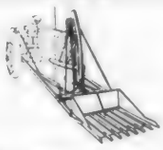
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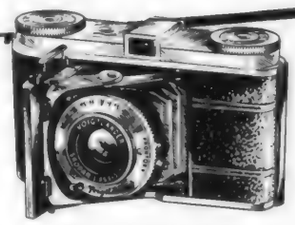

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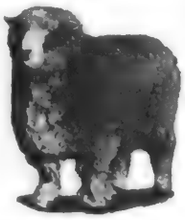

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On the initiative of Department of Agricultural Research of the *Canadian Radium & Uranium Corporation* of New York, under the directorship of Dr. Leandro Tomarkin, other experiments of a wider range were undertaken by one of the great food processing and canning companies in the United States. Among experiments conducted by this organization in our behalf, one of the most interesting results was obtained in radioactive treatment of cucumber crops, which gave a 51% increase in the number of cucumbers and a 60% increase in weight. Experiments were continued by this organization throughout the years 1944-1946, with highly encouraging results. These experiments extended over test farms in Delaware, Wisconsin, and Ontario (Canada). All proved one basic point: In the overwhelming majority of test cases, best results were obtained when extremely small dosages of radioactive compounds were used.

The Practical Results

The practical results, as said before, are definitely: (1) a considerably greater yield of crops, (2) earlier maturity of plants, (3 sturdier plants, better adjusted to resist adverse atmospheric conditions and, in all probability, certain plant diseases, (4) a better quality of texture, meatiness and taste, and a higher content in carbohydrates due to the increase of the invertase-fermentation in live cells of the plant, under the influence of radioactive substances.

We also succeeded in solving one of the difficult technical problems connected with the use of radioactive compounds in agriculture—namely, the problem of finding the proper method of incorporating and evenly distributing extremely small quantities of radioactive micro-elements in the fertilizer and soil.

In considering the value of radioactive compounds for agricultural uses, such as those prepared for us, we must also remember that the economic factor, i.e. the price, is now of a very small importance to the actual user, due to the extremely small quantities involved.

Our new knowledge of the workings of atomic energy gives a cue to the influence which radioactivity has on the growth and life of plants. It is the lack of that knowledge only a few years ago that caused so many competent people to say that they did not know why plants were responding to radioactive radiation.

Radiation Is Not a Food

This response is due to the fact that radioactive elements play, in relation to plants, a role similar to that of vitamins. Vitamins do not *replace* nutritive matter. Yet, lack of vitamins in foods may cause serious diseases in the human body. The presence of minute doses of radioactive elements in plants assures a proper balance of those micro- and ultramicro-elements without which a plant cannot grow well. Very frequently, therefore, what is needed to improve a crop is not a large amount of nitrogenous, or phosphoric, or other conventional fertilizers, but rather minute quantities of radioactive elements, or micro-elements.

This fact is all the more interesting, as the experiments conducted with leguminous plants have shown the importance of radioactive elements with regard to the absorption of atmospheric nitrogen of the air by such plants. It has specifically been observed, in the case of beans and peas, that the tubercules, with the help of which leguminous plants assimilate nitrogen from the air, do not form on the roots of the plant in the absence of radioactive elements, while in containers with radium these tubercules develop with intensity and assimilate, in addition, almost as much of the atmospheric nitrogen as they absorbed of nitrogen which had been mixed with the nutritive matter.

The action of these elements on plants consists, primarily, of that energy which, under the form of rays, continuously emits from these elements as a result of an uninterrupted process of radioactive disintegration. This atomic disin-

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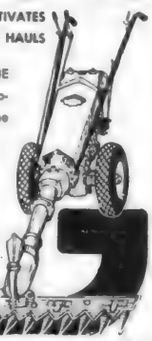

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tegration of radioactive elements within the nutritive medium of the plant and within the plant itself, plays an important part in the synthesis of organic combinations, such as carbohydrates, proteins, and others, within the living cell. In evaluating the power of this atomic energy within the living cell, one has to take into consideration—in the light of recent scientific advances—not only its yield in heat, but also its yield in kinetic energy.

The Conclusion

Thus, we are led to a striking conclusion: namely, that under the action of radioactive elements, there may be induced within the living cell not only chemical but also nuclear reactions.

In fact, such nuclear reactions are constantly taking place in living cells, including the human body itself, as has recently been shown by Dr. Aristide V. Grosse of the Houdry Process Corporation, Marcus Hook, Pennsylvania, and his associates. Dr. Grosse shows that these nuclear reactions within the living cell may be explained by the action of cosmic rays and the ensuing formation of Carbon 14.

Radiation Normally Present in Rich Soil

In connection with the use of radioactive elements in agriculture, it must be emphasized that the dosages used are so small that they, in fact, are quite identical with those quantities of radioactive elements which are normally to be found in rich soil. The small quantities of radioactive micro-elements, when absorved by man or animals through consumption of plants grown in radioactivated soil, will remain far below the normal limits accepted for the intake of radioactive elements by a living body, and, therefore, will be completely harmless.

Radioactivity in its application to the life of plants, i.e. the use of radioactive compounds in agriculture, has become a reality. This reality must not be overlooked in humanity's struggle for a better, richer, and happier life.

BORIS PREGEL, President
Canadian Radium & Uranium Corp.
630 5th Ave., New York 20, N. Y.

Readers of this letter may recall an Associated Press dispatch, September 24, from Tokyo, quoting Takeo Furuno, a Japanese agronomist. He stated that at Nagasaki in the summer of 1947, crops showed an increase from 50 to 300 per cent.

Two physicists quoted by AP in the dispatch both discounted the story. Dr. George Gamow said radioactivity would hinder rather than help the growth of crops, and Dr. Ugo Fano called it a phenomenon unknown to science. However, one American scientist, Dr. Austin M. Brues, an atomic scientist who had been to Nagasaki, said he knew Furuno and believed him a competent observer.

Science, like life itself, never advances in a straight line. It backs and fills and with each new movement there is considerable opposition. Mr. Pregel's letter contains an idea (add a dose of radioactive material to regular chemical fertilizer) previously reported in letters to various journals of pure science.

This basic idea is not yet accepted as workable by all scientists. Farm Quarterly showed Mr. Pregel's letter to a USDA scientist at Beltsville, Md., who said: "Greenhouse experiments (with radioactive fertilizer) have been run at Beltsville. In only one case were the greenhouse results affected significantly . . ."

Paul C. Aebersold, Chief, Isotopes Division, United States Atomic Energy Commission, Oak Ridge, Tenn., said: "We do not believe that minute quantities of radioactive material will stimulate plant crops to increased production. We are interested in hearing reactions supplied by other groups relative to Mr. Pregel's letter."

Some experiments with radio-active uranium waste were run at the South Salem, N. Y., farm of Henry Wallace, former Vice President. Wallace reports a 30% higher yield in tomatoes grown by soil-less gardening, with the use of radioactive fertilizer supplied by C R & U's ubiquitous Mr. Pregel.

—Ed.

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BROME GRASS ROOTS GROW DEEP

Sir:

In the autumn issue of Farm Quarterly, you have a color picture (page 6) of brome grass showing the length of its root system.

Not wishing to outdo your contributor, Mr. Robert R. Johnston, but rather desiring to present a more factual picture of the extensive root system of brome grass, another picture is submitted. The plant shown is four years old. Yours doubtless was a younger plant and displayed a root system about 30 inches deep.

The root system of this plant is 48 inches and the picture was made by Jack Newville, of the U. S. Soil Conservation Service. I am sorry but I do not have the name of the farmer holding the brome grass.

Perry R. Carroll
U.S. Soil Conservation Service
U.S.D.A.

PILGRIM GOOSE

(Continued from page 75)

of 10 to 15 eggs. Since a hen will be unable to turn such heavy eggs, you will have to give her a hand every day or so. It's a good idea to sprinkle the eggs with lukewarm water every day after the first week, to keep them from drying out.

Even though goslings hatch slowly the eggs should not be disturbed at hatching time. They do not need feed for 36 hours; then they can be given a bowl of stale bread soaked in milk. Grass should be their main feed, with only an occasional feeding of ground grain.

An interesting by-product of goose-raising is the feathers. You can make your own fine-down pillows or sell the feathers.

On a farm, a few geese cost little to raise in summer. You may keep your young stock without a grain ration until late fall and then select, kill, or sell.

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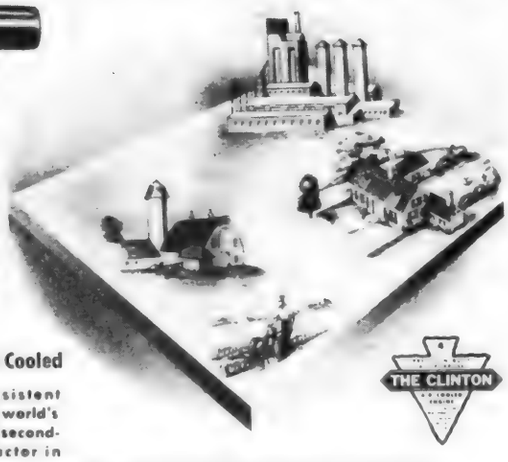

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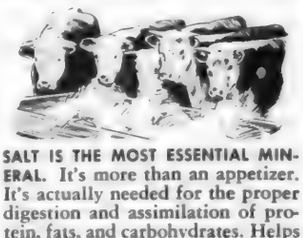
Get the *Extra* Beef that's in Your Feed

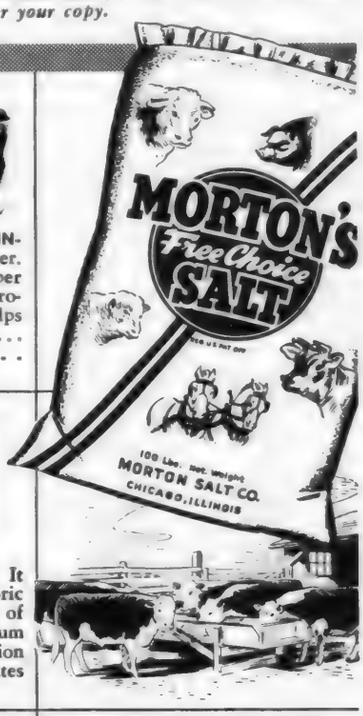
Feed Morton's Free Choice Salt

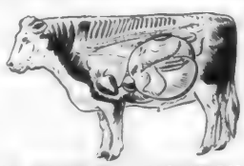
Feed is the expensive part of producing beef. It accounts for 85 per cent of the cost. Often that cost can be cut. Shortchanging the animal won't do it . . . that only means higher costs. The secret is helping the animal to digest and assimilate its feed more completely, more efficiently. And often, all it takes is Free Choice Salt.

This is true of hogs . . . of dairy cows . . of sheep. It's equally true of beef animals. With plenty of salt they look better . . . make faster gains . . . get more good out of their feed . . . The FREE Book below shows how and why. *Write for your copy.*

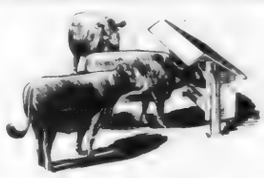


SALT IS THE MOST ESSENTIAL MINERAL. It's more than an appetizer. It's actually needed for the proper digestion and assimilation of protein, fats, and carbohydrates. Helps livestock put on weight rapidly . . . eat less per pound of gain . . . reach market weight earlier.





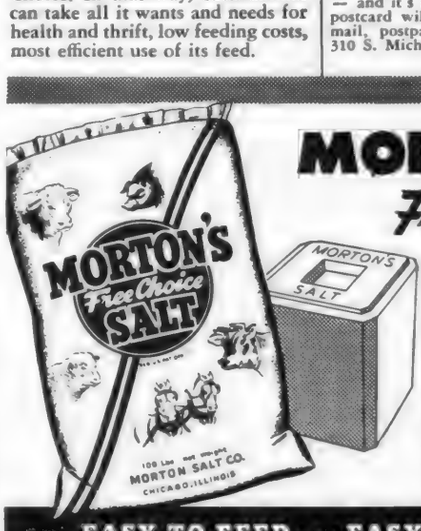
SALT STIMULATES DIGESTION. It supplies chlorine for hydrochloric acid needed in the digestion of protein. It also supplies sodium which is vital for the assimilation and use of fats and carbohydrates in feed.



FEED SALT FREE CHOICE. For best results, salt should be fed Free Choice. In that way, each animal can take all it wants and needs for health and thrift, low feeding costs, most efficient use of its feed.

Send for FREE Booklet

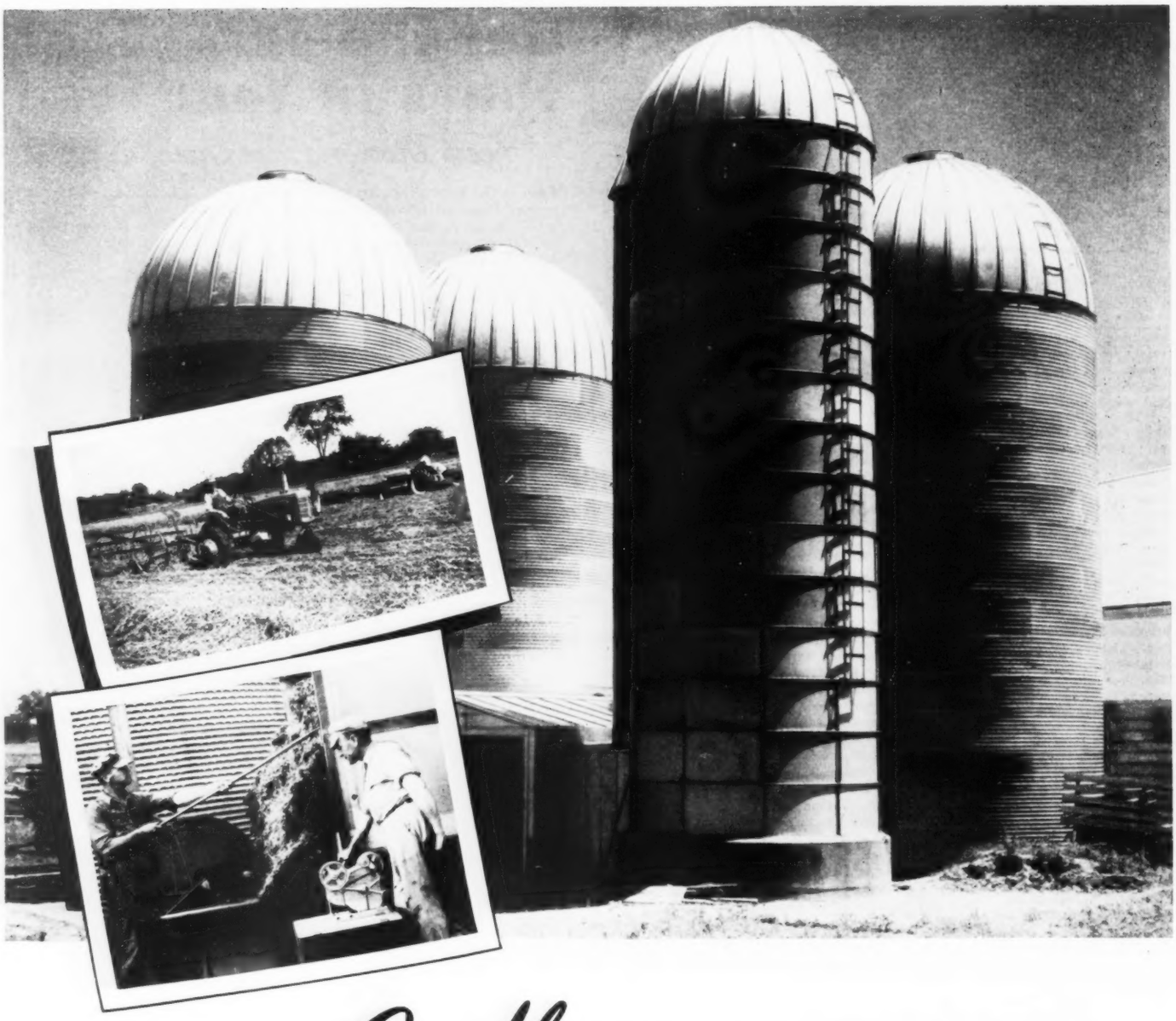
Every farmer and feeder should have this practical, well illustrated 40-page book which tells, in detail, how to feed salt for the greatest gain. Not only tells how to feed salt free choice, but also provides plans for making practical, economical feeders. Only book of its kind — and it's free for the asking. A penny postcard will bring your copy by return mail, postpaid. Morton Salt Company, 310 S. Michigan Ave., Chicago 4, Ill.



MORTON'S *Free Choice* SALT

Morton's Free Choice Salt is especially developed for more profitable livestock feeding. It's easy to use for mixing. Be sure to ask your dealer for it by NAME . . . MORTON'S FREE CHOICE SALT.

EASY TO FEED . . . EASY TO MIX
MORTON'S *Free Choice* SALT



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MAKE HAY THE MODERN MARTIN WAY

Farmers all over the country are discovering that they can take the gamble out of haymaking. Today, you can harvest and store hay the same day it is cut -- in Martin "Steel-Bilt" Haymakers. There's no gambling with weather, no loss of hay in the field. You are assured of 100% of your crop.

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The Martin Haymaker's all-steel construction provides absolute fire-proof, spoilage-proof storage. Advanced ventilation insures proper curing. It is today's most modern, convenient and economical haymaking method.

And to round out your feed storage facilities -- investigate the advantages of the Martin "Steel-Bilt" Silo. It is designed for all types of silage. Used in conjunction with the Martin Haymaker you are provided with the finest, most efficient stock feeding facilities available.

Both are designed for easy erection. They are well built because they are "Steel-Bilt". They last a lifetime with minimum upkeep and repair.

Martin also makes a complete line of "Steel-Bilt" Dairy Barns, Corn Cribs, Feed Storage Buildings and Poultry Houses in various sizes and capacities. For the name of your nearest Martin Distributor, or for complete information on any Martin Farm Building, write:

MARTIN STEEL PRODUCTS CORP.
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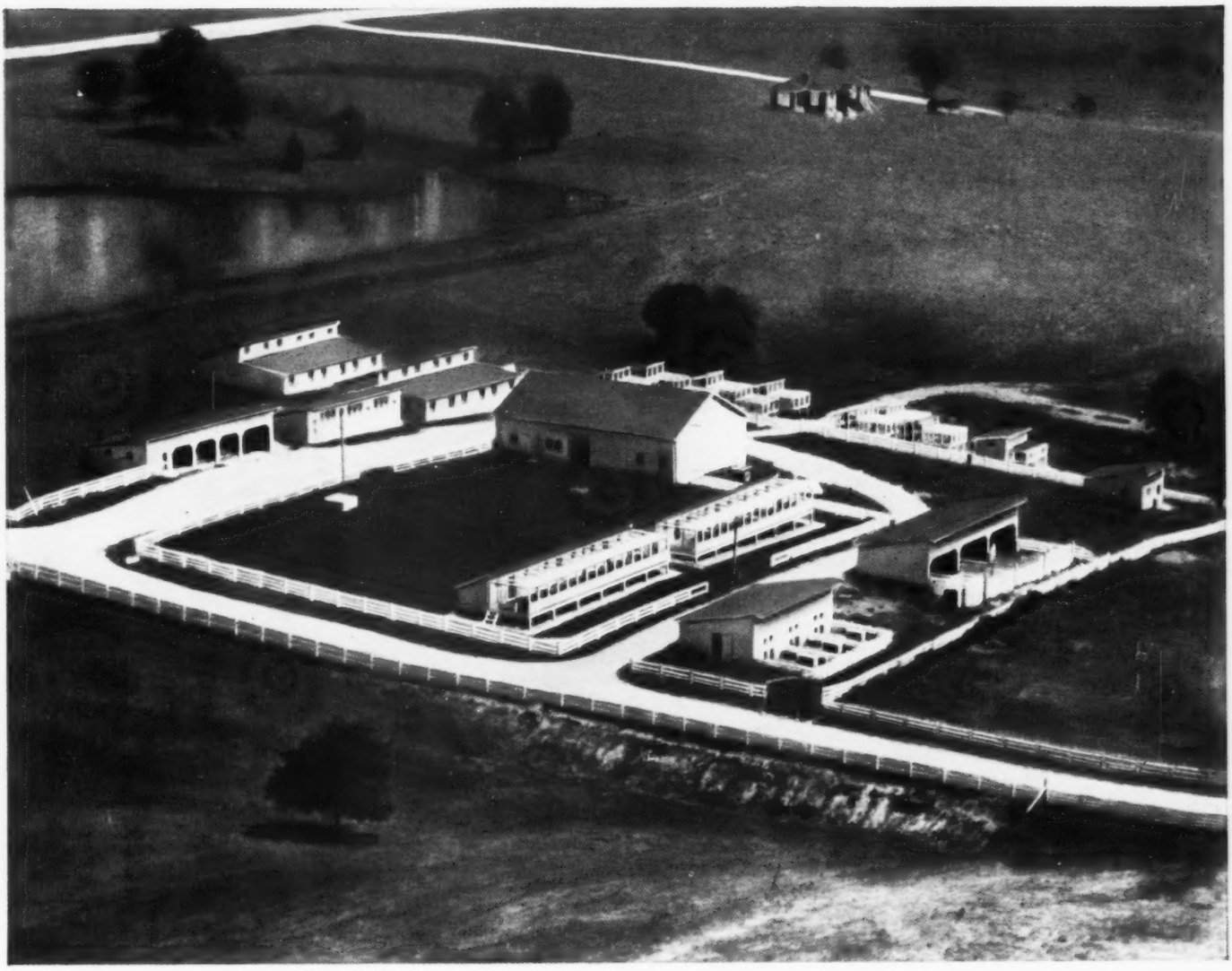
STEEL MARTIN Farm Buildings -BILT

PIONEERS IN THE DESIGN AND FABRICATION OF STEEL BUILDINGS EXCLUSIVELY FOR THE FARM



236 ACRE NUTRITION LABORATORY

Though this 236-acre Kentucky farm is not primarily a producer of grain crops, and though most of its fields seldom feel the bite of a plow—nevertheless, its harvests benefit innumerable livestock farmers.

Here at the Seagram Nutrition Farm, near Louisville, Kentucky, scientists are working to develop peak nutritional efficiency in farm animal rations through controlled feeding trials. Beef cattle, hogs, chickens, and turkeys are fed balanced rations of straight grains and Seagram grain products: dried solubles and dried grains.

These experiments show how Seagram grain products can be used economically by livestock producers and feedmen in preparing farm animal rations.

The 236-acre farm laboratory pictured above is dedicated to the scientific study of poultry and livestock feeding. Seagram will continue to serve America's basic industry, agriculture, by diligent application of its research discoveries to practical feeding. Seagram will be glad to provide information on the use of its grain products to balance your feed rations.

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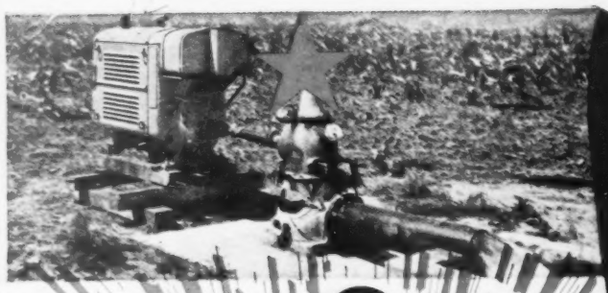

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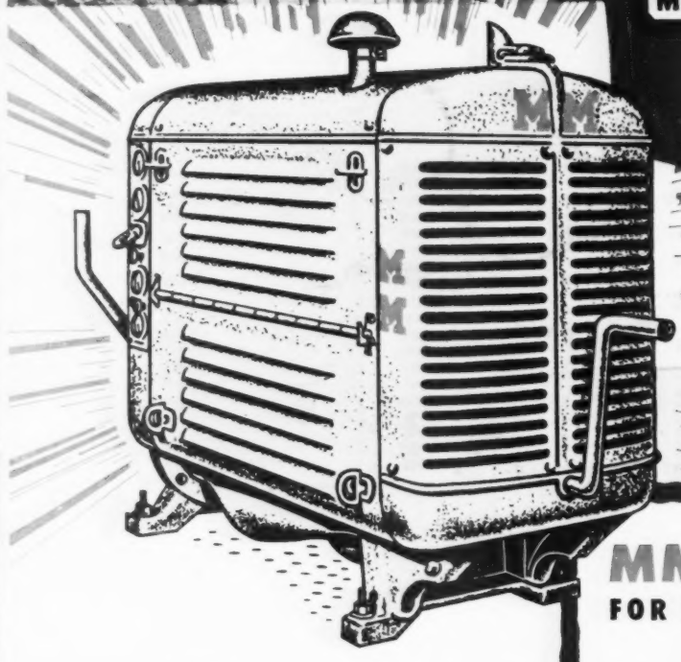
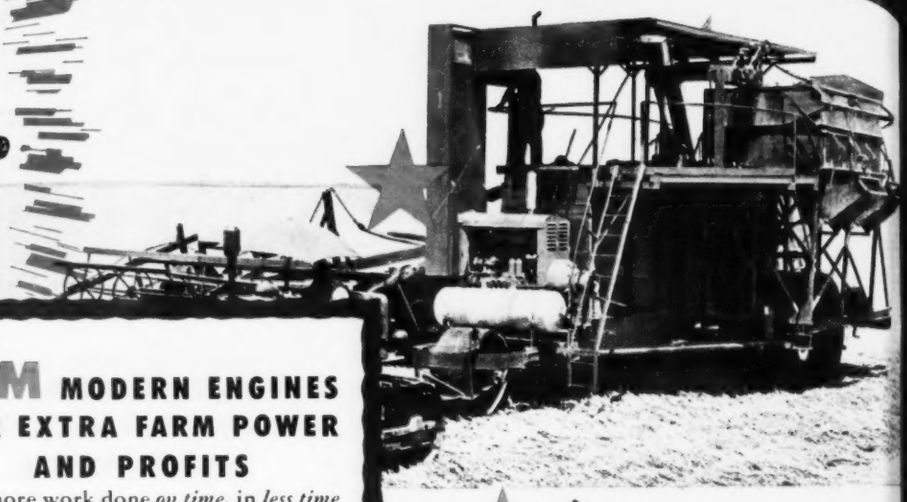
For Profitable POWER





MM MODERN ENGINES FOR EXTRA FARM POWER AND PROFITS

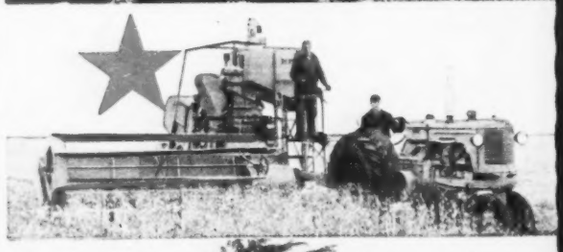
Get more work done *on time*, in *less time* with MM Power Units of *proved dependability.*

MM Power Units are soundly engineered and ruggedly constructed to give you economical, dependable service. Lower engine speeds insure longer life. Minimum service requirements provided for by easy accessibility. Pressure oiling system . . . precision bored cylinder blocks . . . high turbulence combustion chambers with controlled cooling . . . carburetion equipment for gasoline, natural gas, Butane, or distillate. Many other exclusive features recommend MM Power Units for a wide variety of farm uses.

25 H.P. TO 215 H.P. FOR

Power hay balers, combines, threshers, ensilage cutters, feed mills, corn shellers, flame cultivators, peanut hullers, potato diggers, viners, sawmills, irrigation, sprayers, dusters, booster pumps, sprinkling systems, generators, sheep shearers, conveyors, elevators, blowers, beet loaders, etc.

Get all the facts from your MM Dealer.



MM Power Unit, operating a 27" Couch Syphon Pump, saved 160 acres from flood on the Russell Bierly farm, Walkerton, Indiana.

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